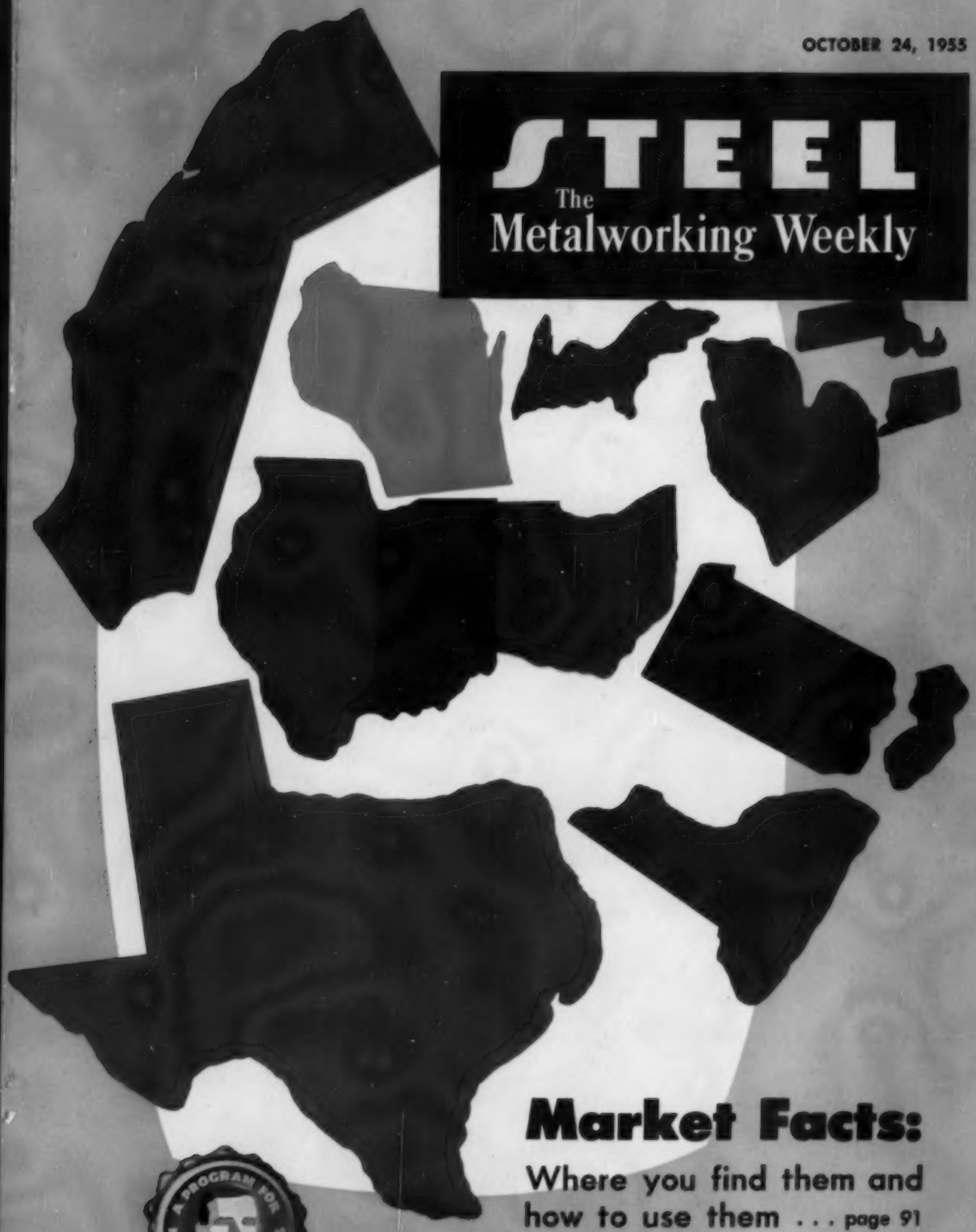
OCTOBER 24, 1955

STEEL

The Metalworking Weekly



Market Facts:

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A PROGRAM FOR MANAGEMENT IN 1955

No. 9 in 1955 Management Series

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Get Both
bearing features

ALLIS-CHALMERS
General Purpose
MOTORS

fully enclosed and protected

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

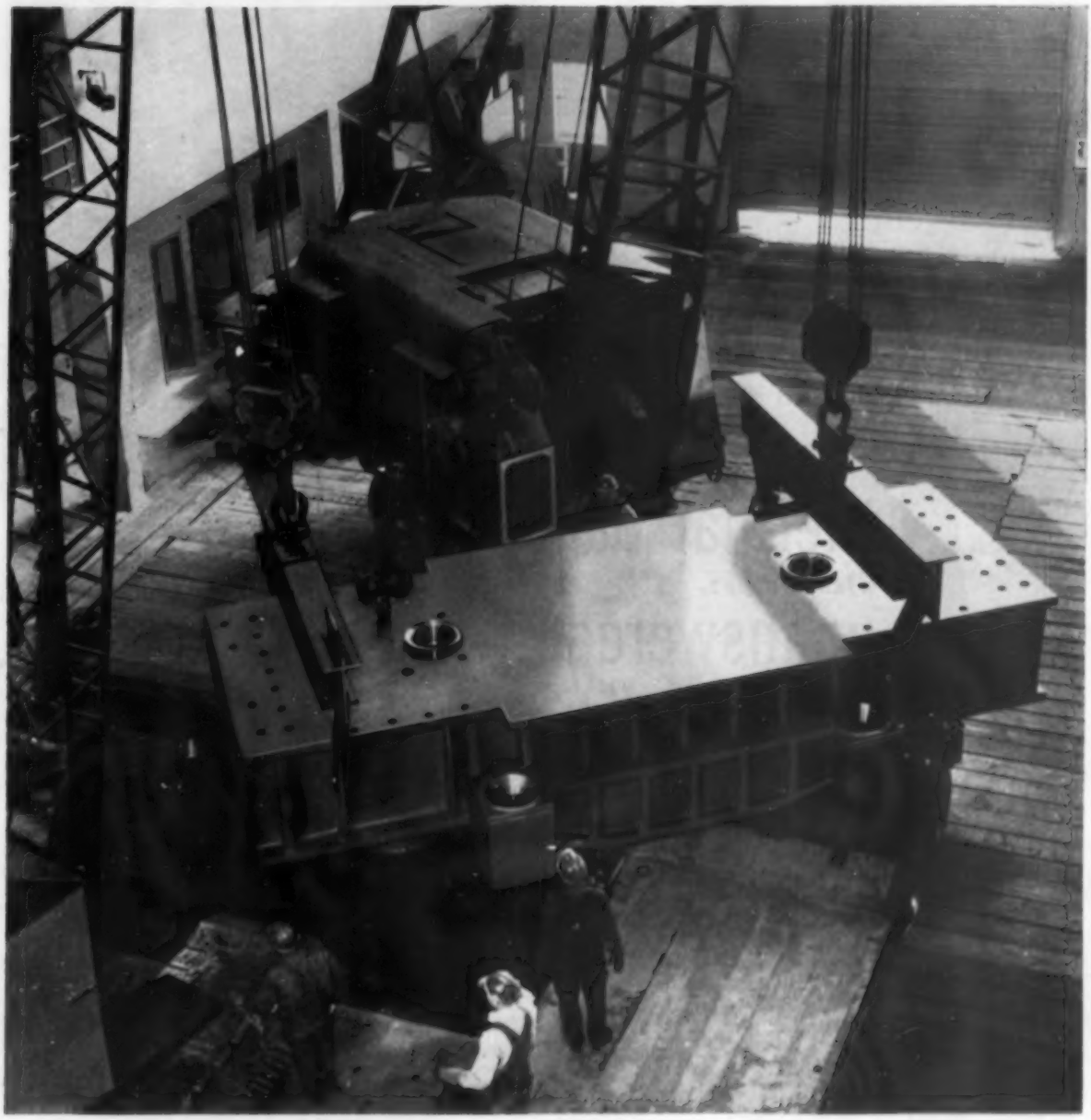
. . . yet easy to grease

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at two points provide both means for inserting new grease and a means of flushing out old grease.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6210.

A-4603

ALLIS-CHALMERS



BED PLATE FOR WORLD'S LARGEST TESTING MACHINE

Here being positioned on its supports is the bed plate for the new testing machine at Lehigh University's Fritz Engineering Laboratory. Fabricated by Baldwin-Lima-Hamilton Corporation, the machine's capacity of 5,000,000 lb and sizes of specimens it can handle make it the world's largest universal testing machine. Obviously strength was a vital requirement in the steel for the bed plate. So was weldability, for the plates in the weldment range up to 3½ in. in thickness. Mayari R low-alloy, high-strength steel was chosen for this gruelling service. Not only is Mayari R 50 pct stronger than carbon structural steel but it is actually easier to weld in heavier plate thicknesses. Catalog 353 tells the Mayari R story in full. If you would like a copy, just write our nearest office.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mayari R makes it lighter... stronger... longer lasting

beyond the sonic wall...
thermal barriers
with, as yet,
unanswered
challenges!
• With each "boom" of a jet crashing through the sonic barrier, aircraft engineers give the sleeping dragon's tail another twist. Out there in space—which mankind has dedicated itself to conquer, lies the ugly, wallowing form of the next big challenge—temperature!
We manufacture many things for our air arm . . . precision gear assemblies for accessory drive units, actuators, transmissions, computers and controls . . . complete components such as bomb hoists, gun turrets, radar tracking and scanning assemblies, hydraulic actuators. But we're also hard at work on top secret equipment which, in the near future, will help arm our "flying St. Georges" as they slay the fiery dragon.
Challenges like these are our long suit. We've helped solve tough problems for years . . . and will keep on assisting wherever possible. Make your development and production problems our problems. Just write, wire or call: The Steel Products Engineering Company, Springfield, Ohio.
SPECO
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ENGINEERS AND MANUFACTURERS • SPRINGFIELD, OHIO

BAKER announces a NEW LINE of BATTERY-POWERED FORK TRUCKS

with many added features...

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- **EASIER TO STEER**—Less weight on steering axle, combined with automotive type steer, provides finger-tip control even on largest models.
- **MORE CONVENIENT CONTROLS**—Located right where operator wants them. Easy and simple to actuate.
- **FULL VISIBILITY**—No cowl, no console—no "neck craning." Greater safety, less operator fatigue, more work.
- **EASIER TO GET ON OR OFF**—Absence of cowl and other obstructions means easier and faster mounting and dismounting.
- **DYNAMIC BRAKING**—Greater safety on ramps, smoother stops, less wear on brake lining, greater protection for truck and load.
- **SEPARATE PARKING BRAKE LINKED TO DRIVER'S SEAT.** Automatically holds truck when driver dismounts—even on incline. On armature shaft—independent of wheel brakes.
- **HYDRAULIC WHEEL BRAKES**—Finest available. Self-energizing, self-equalizing. Single point adjustment.
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Write for complete information:

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SE4

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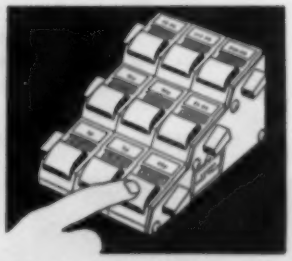
In figuring out new systems of automatic electrical control, Veeder-Root *Count*rol can supply vital connecting links. For instance, this Predetermining Counter can be hooked into such a system to light a light, ring a bell, or actuate a mechanism to stop a machine or process *at any pre-set point.* And there are many other Veeder-Root Counters that can serve as "countponents" in almost any way desired. Or special counters can be designed for specific applications. Engineers in any industry, now engaged in working out automatic control systems, can count on Veeder-Root engineers to work with them on any problem where reliable facts-in-figures are needed.



New *Vary-Tally* Multiple-Unit Reset Counter comes in any combination up to 6 banks high, and 12 units wide Write for news sheet and prices.

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"The Name That Counts"

STEEL
The Metalworking Weekly

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Editorial & Business Staffs, 16. Advertising Index, 165. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 W. 39th St., New York 18, N.Y.

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscription in the United States and its possessions, Canada, Mexico, Cuba, Central and South America, one year, $7.50; two years, $15; all other countries, one year, $20. Single copies (current issues), 50 cents. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland.
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behind the scenes

Rats, Anybody?

How are you fixed for rats? Foster D. Snell Inc., chemists, biochemists and bacteriologists, Bainbridge, N. Y., can supply all your rat needs before you can chant "mi kczemi stczuri," which is an old Polish expression meaning "we want rats." The Snell people are currently riding herd on a colony of 20,000 happy, contented, pure white, pink-eyed rats, and while they love them dearly, they stand ready to sell them by the gram.

The late Dr. George Cornell Supplee, a scientist who received the Borden Award and a Gold Medal for developing the practical methods of commercial irradiation of milk to increase its vitamin D content, is the man responsible for starting the Bainbridge rat farm. As time went by the rats settled into a pattern, and since 1929 no more outside animals were permitted to sully the strain. In 1950 the Snell chemists took over the rat business. According to their delightful publicity, they have developed what might be called an all-purpose rat. Indeed, the creatures are so amiable and lovable we can't decide whether they should be cuddled or eaten.

In commemoration of the 1,000,000th rat born since the founding of the colony, Foster D. Snell Inc. has published a booklet, *"Rats for Research,"* in a lighter vein. Copies are available from the Public Relations Department, Foster D. Snell Inc., 29 W. 15th St., New York 11, N. Y.

The Atom Unmasked

When STEEL decided to publish an article on "Atoms for Business," it assigned Technical Editor Allen G. Gray to do the job. The selection of the good doctor was another indication of the astuteness of management. He just happens to be a member of the Advisory Committee on Industrial Information, AEC. If anybody around this shop knows anything about atomic stuff, it *has* to be our technical editor.

Demonstrating his inside knowledge, Dr. Gray whipped out a manuscript in lingo approaching that of the fourth dimension, translated it into straight American and had it transcribed for sense. After the hard work was done, he leaned back in his chair and watched an office boy stagger into his office.

"What you got there, son?" he inquired, glancing with some curiosity at the load that bent the lad almost double.

"It beats me, doc," replied the manly young fellow, dropping the bundle on the desk. "All I know is I was hired to deliver mail—and if this is mail, shake hands with a former employee."

The mail was identified as six gigantic volumes of declassified atomic material, released by the AEC as an aftereffect of the Geneva Conference. Distributed first to committee members, it now is for sale by the Superintendent of Documents, Washington 25, D. C. The *Reactor Handbook, Vol.* 1, *Physics,* was about the size of the Chicago Telephone directory. It contained 790 pages, and weighed about as much as a young aardvark. *Vol.* 2, *Engineering,* 1075 pages; *Vol.* 3, *Section* 1, *General Properties of Materials,* 610 pages; *Neutron Cross Sections,* 1 x 2 ft, 328 pages; *Research Reactors,* 442 pages; *Chemical Processing and Equipment,* 302 pages.

Dr. Gray kindly offered to lend us the literature, and we've decided that if we can sandwich in some reading time between our comic books and TV western programs, we're going to learn all about atomic energy.

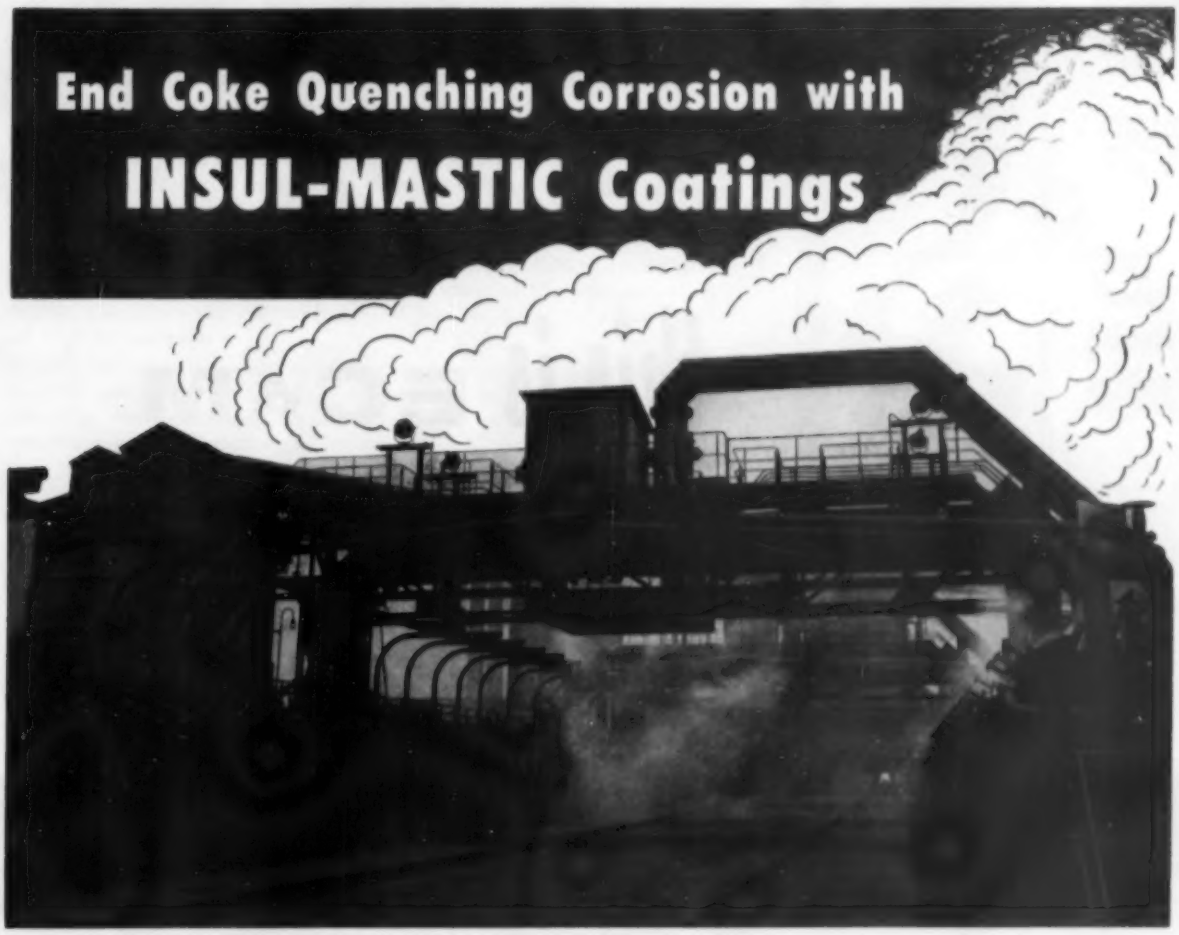
Work Through Joy

Personnel work must be interesting, valuable, too. It really is the application of psychology in industry —and darned if Norman R. F. Maier didn't write a book on that subject: he calls it *"Psychology in Industry,"* and the Houghton Mifflin people are bringing out all 678 pages of it for $7.50. Mr. Maier tells us that companies are applying the latest findings of social and clinical psychology and making everybody happier.

Shrdlu

(Metalworking Outlook—Page 45)

End Coke Quenching Corrosion with INSUL-MASTIC Coatings



Top-view of a U. S. Steel Corp. coke battery at Clairton, Pa., coated with INSUL-MASTIC.

Where do you need a protective coating? Our technical engineers can tell you. Write for information about this consultant service before planning to build or coat.

Here is the top-side of a coke battery. A carload of burning coke has just been quenched. Steam is drifting over all metal equipment in the area. Once this would have meant severe corrosion, but now INSUL-MASTIC protects this equipment.

INSUL-MASTIC coatings are ending coke quenching corrosion in steel mills and chemical plants everywhere. They are extremely durable and not affected by corrosive industrial atmospheres. INSUL-MASTIC coatings now in coke battery service six years prove that many, many more years of life can still be expected. INSUL-MASTIC is a *Superior* bituminous coating having carefully selected mineral fillers. It is spray applied 1/16" to 1/8" thick.

Throughout the nation, mills and plants having coke battery operations are specifying INSUL-MASTIC. They are coating all pipes, tanks, beams and other equipment normally corroded by industrial atmospheres.

Write today for the name of your nearest INSUL-MASTIC representative.

Insul-Mastic

think first of the coatings that last!

Representatives in Principal Cities

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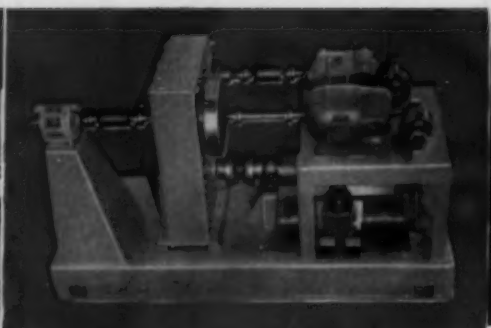
this is EC&M

For maximum "teamwork", the drafting and engineering departments are located side by side at EC&M.



The Test Tower, which dominates the EC&M mail-line, houses the space heating unit equipped with a g.e. and an ac motor used to test and develop heat-control applications.

Assembly line production of Oil-Break Starters for hazardous locations. Each starter has its own oil disconnect switch.

New manufacturing plant and offices in Cleveland now provide **EC&M** with the most modern facilities for the production of motor control apparatus, automatic motor starters, and lifting magnets.

These facilities include new production machines, an enclosed test-tower for developing hoist-control circuits, and an improved flow of materials . . . all devoted to the efficient building of Magnetic Controllers, Brakes, Limit Stops, Resistors, Starters and Magnets. Production is backed by a closely knit engineering and manufacturing team.

Shown on the right are a few of the well-known **EC&M** products and the photographs directly below highlight some of the new manufacturing operations which will assure you of better service from all **EC&M** equipment.

EC&M has already earned a reputation for quality and engineered-to-order equipment. Now this reputation is magnified by a PLUS value by means of these enlarged facilities for developing, testing, engineering, manufacturing and shipping . . . all under one roof.

Write for your copy of the new EC&M Plant Booklet No. 6185

THE ELECTRIC CONTROLLER & MFG. CO.

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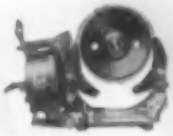

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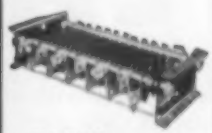

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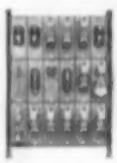

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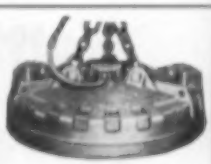
Bulletin 905.



ALL-WELDED MAGNETS
Bulletin 900.

Oil-Break 2200-5000 volt Motor Starters.
Bulletin 1062.

Air-Break 2200-5000 volt Motor Starters.
Bulletin 1060.

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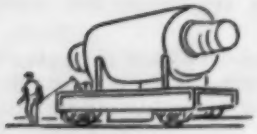
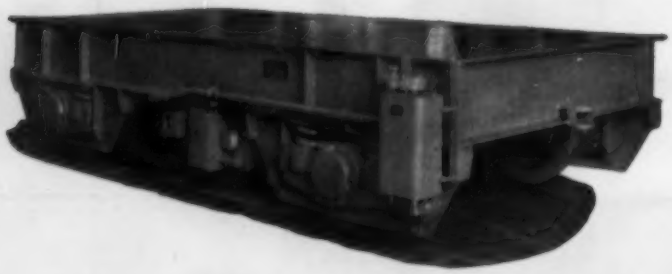
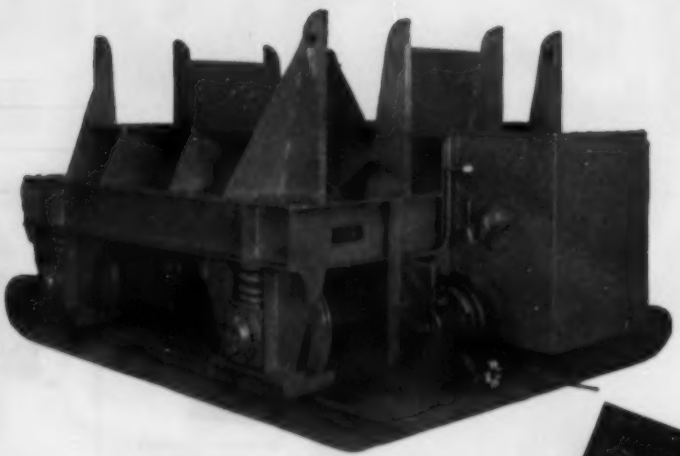


Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



50-TON STORAGE BATTERY FLAT CAR



64-TON ELECTRIC FLAT CAR

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

New Value Analysis Program

May we have 12 copies of the article, "Value Analysis: Equal or Better Performance at Lower Costs" (Sept. 19, page 101)? We are setting up a value analysis program, and we are sure this article will help spread value analysis thinking throughout our organization.

John H. DeRosmer
Value Analyst
Hotpoint Co.
Chicago

Welding Guides Are Helpful

In your Oct. 10 issue, we have just read the fine articles, "Choose the Right Arc Welding Electrode" (page 138) and "Arc Welding Electrode Buyers Guide" (page 142). We would appreciate three reprints. They should prove valuable reference material.

C. M. Heller
Chief Engineer
Marquette Coppersmithing Co.
Philadelphia

One Man's Meat

The article, "How To Tame Wildcats" (Oct. 3, page 37), should provide considerable meat for our training courses. We have a most active membership of 750 foremen from almost 50 different industries. We would appreciate as many copies of this article as you can spare.

Charles M. Coe
President
Kokomo Foremen's Club
Kokomo, Ind.

Your article is well done. We would like several reprints for use in our supervisory training meetings. They will be of great help to us.

W. E. Spears
Personnel Manager
Emsco Mfg. Co.
Houston

We would like permission to reprint this article in our Management Newsletter which is circulated in our foundry department.

H. O. Johnson
Supervisor-Employee Relations
Foundry Department
Everett, Mass.

• *Permission granted.*

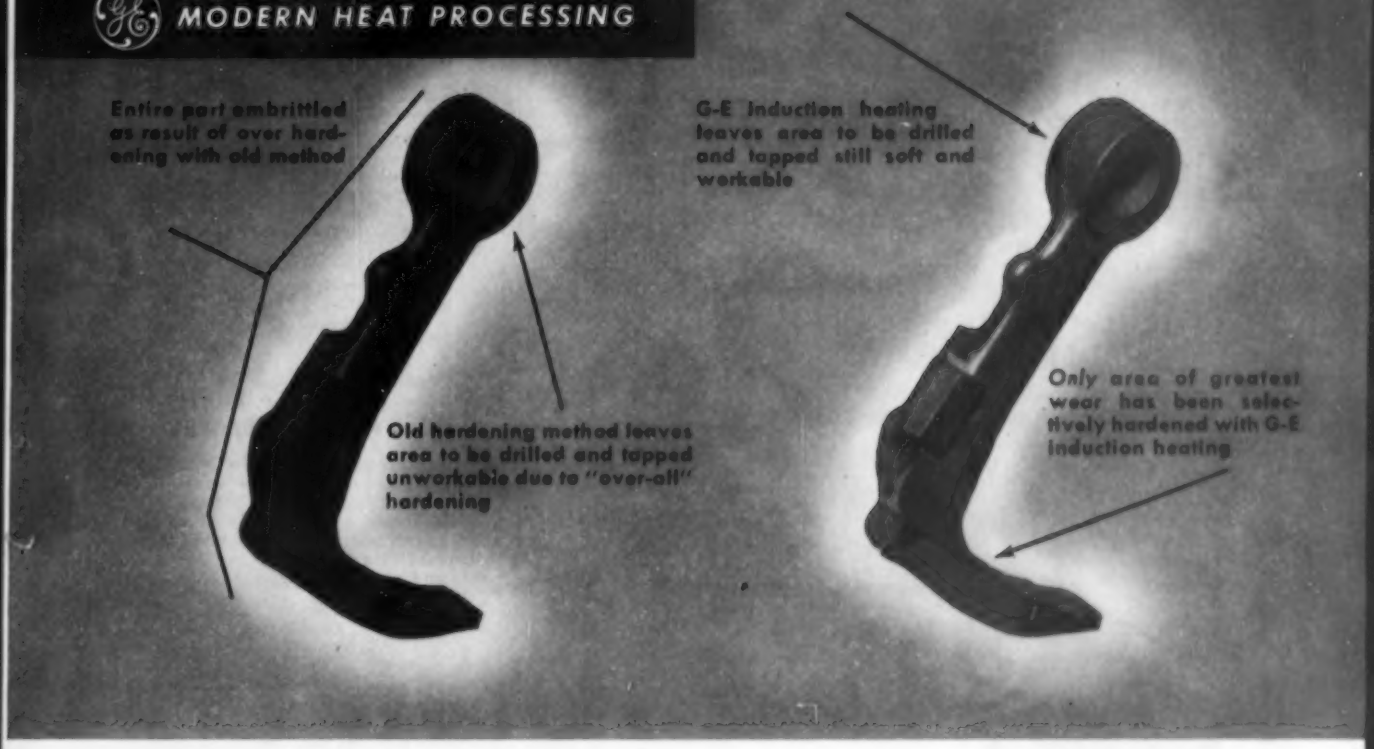
Story Aids Army Engineers

The article, "201-202: New Stainless Steel Types" (Sept. 5, page 133), is of interest to our personnel. They are engaged in the critical materials conservation program of the U. S. Army Corps of Engineers.

Our conservation program would be

(Please turn to page 12)

MODERN HEAT PROCESSING


Entire part embrittled as result of over hardening with old method
Old hardening method leaves area to be drilled and tapped unworkable due to "over-all" hardening
G-E induction heating leaves area to be drilled and tapped still soft and workable
Only area of greatest wear has been selectively hardened with G-E induction heating

PROBLEM:

Chill-cast rejects at Draper Corporation due to (1) Embrittlement (2) Over-all hardening

SOLUTION:

G-E Induction Heater Cuts Rejects 95% By Pinpoint Hardening Cast-iron Parts

The East Spartanburg, S. C. division of Draper Corporation was having difficulty controlling the hardening of cast-iron parts. Their old chill-cast hardening method forced them to reject many of the parts, which were overhardened and brittle. In addition, they had no way of controlling the size of the area to be hardened. This made drilling and tapping operations difficult—and frequently impossible.

SINCE INSTALLING A 20-KW G-E induction heater in their production line, they are able to cast the parts, drill and tap them while the cast iron is still soft, and then selectively harden only the area of greatest wear. This "pinpoint" hardening reduces the heated area of the parts by 70-90%. As a result, rejects have been cut 95%, costs are reduced, and the Draper Corporation is producing a product of uniform high quality.

THE COMPLETE SATISFACTION of Draper Corporation with their General Electric induction heating equipment was expressed by Mr. Fred Burgess, Plant Engineer: "Our G-E induction heater has been in operation for over five years. During that time we have greatly reduced manufacturing costs because of our decreased scrap losses and increased production. Maintenance of the heater hasn't been any problem, either. We just couldn't ask for any better service than we've had from our G-E equipment."

GENERAL ELECTRIC

WATCH FOR ANNOUNCEMENT

of General Electric's complete NEW line of electronic induction heaters

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LETTERS

(Concluded from page 10)

aided considerably if we could receive your permission to reproduce this article for distribution to laboratories and procurement offices within the Corps of Engineers.

W. H. Kindle
Assistant, Procurement Division
Military Supply
Department of the Army
Office of the Chief of Engineers
Washington

• *Permission granted.*

Decals To Be Investigated

We have read in the Technical Outlook column of Sept. 19 (page 111) about decals made of anodized aluminum foil that are easy to apply, having an adhesive bond. Could you give us the manufacturer's product name? We would like to investigate it.

W. W. Windahl
Purchasing Agent
Corry-Jamestown Mfg. Corp.
Corry, Pa.

• *The decals are called Speedy-Cals. They were developed and produced by North Shore Nameplate Inc., 214-227 Northern Blvd., Bayside, N. J.*

Many Facts in Small Space

May we compliment you on the Metal Selector insert in the Oct. 10 issue. You have done a wonderful job in condensing so much information into so little space. We would appreciate 20 copies for use in our plants.

Donald L. Colwell
Director of Laboratories
Apex Smelting Co.
Cleveland

We think your Metal Selector is one of the finest we have seen. We would like 20 copies.

J. A. Mogle
Vice President
National-Standard Co.
Niles, Mich.

The Metal Selector is most helpful to us. May we have three copies?

Stanley M. Goodman
District Sales Manager
Allegheny Ludlum Steel Corp.
Syracuse, N. Y.

Wire with Mirror Finish

I would appreciate additional information on the mirror finish stainless wire mentioned in the Technical Outlook column of Sept. 12 (page 97). It requires no plating, coating or polishing and generally costs no more than ordinary stainless wire.

Carl B. Post
Vice President & Technical Director
Carpenter Steel Co.
Reading, Pa.

• *We suggest you write National-Standard Co., Niles, Mich.*

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For the first time, Automatic Dry Chemical fire protection for class B and C hazards

The science of fire protection took a big step forward when Ansul's *Dry Chemical Piped System* was approved by Underwriters' Laboratories. Eight years of development and field application made this important approval possible.

Ansul's Dry Chemical Piped Systems provide instant, around-the-clock protection for such hazards as paint dip tanks, spray booths, generators, flammable liquid pumping stations, exhaust ducts—wherever there is a hard to reach or highly flammable stationary installation.

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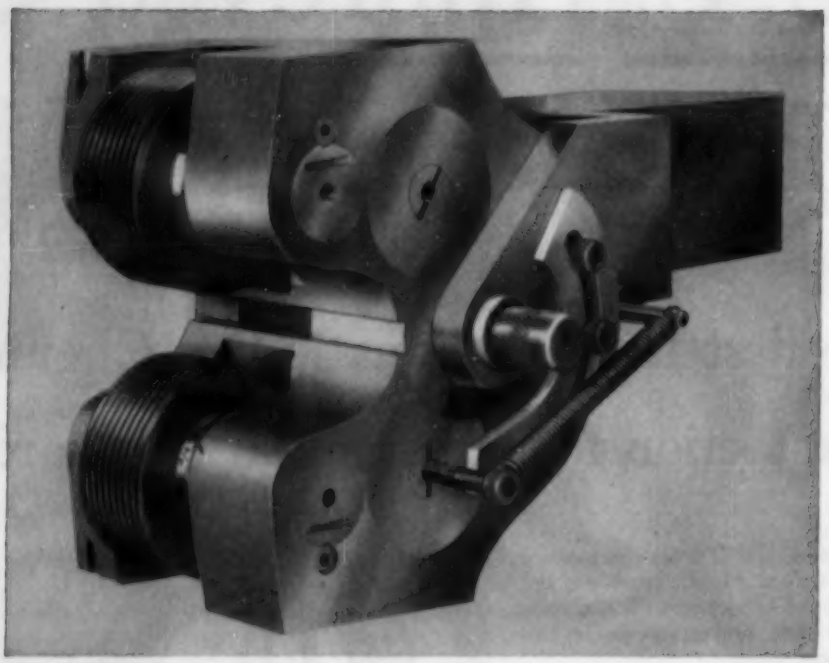
Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Fire Equipment Division, Dept. F-134, Marinette, Wisconsin. *Write Ansul for your copy of new Fire Equipment Catalog.*

ANSUL

Coarse Pitch Threads Rolled to Class 4 Fit..



The LANROLL Thread Rolling Attachments offer features designed to ensure greater accuracy, flexibility and economy when producing threads. . . .

1. *PERFECT HELIX AGREEMENT* allows rolling coarse pitch threads to Class 4 tolerances with long roll life. Threads can also be rolled directly to a shoulder with safety.
2. *ADJUSTABLE DESIGN* provides wide range coverage for each attachment size without loss of rigidity.
3. *SUITABLE SIZES* of LANROLL Attachments have been designed for all types and sizes of automatic screw machines and turret lathes with power feed.
4. *RAPID AND PRECISE SET-UPS* are possible with special gaging methods designed for easy use and the elimination of "cut-and-try" set-ups.
5. Five sizes of Attachments roll a wide range of threads:
   #14—#5 to ⅜"; #18—#5 to ½"; #20—⅜" to 1"
   #22—⅝" to 1¼"; #24—¾" to 1¾"

Other outstanding advantages of these LANROLL Attachments include: behind-the-shoulder threading; taper correction; and excellent thread finish and microstructure. For additional information ask for Bulletin G-96—please send specifications when writing.

LANDIS *Machine* COMPANY

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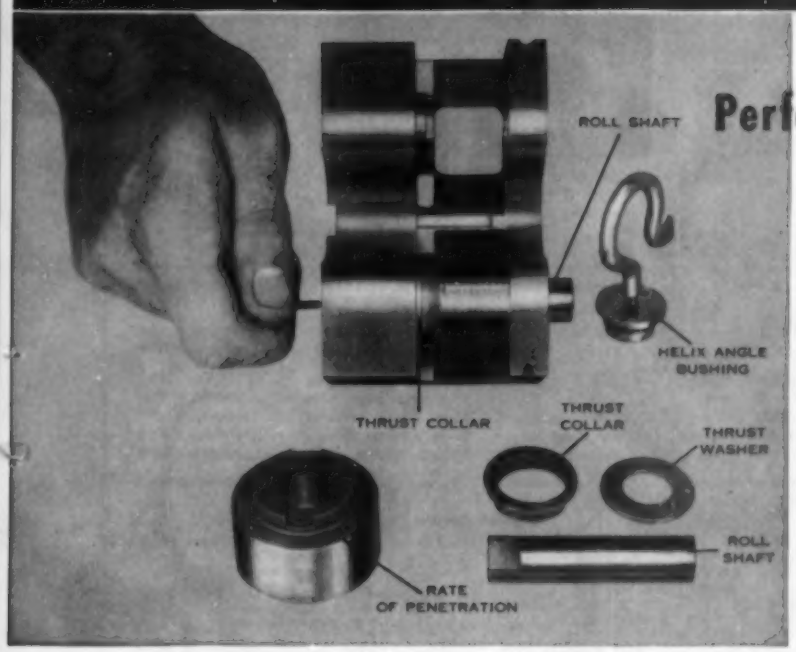


Perfect Helix Agreement

The helix angle bushings, thrust collars, and thrust washers provide a corrective between the workpiece and roll helixes, eliminating drunkenness and ensuring coarse pitch threads to Class 4 fit. All helix angle equipment is designed and marked for rapid changes.

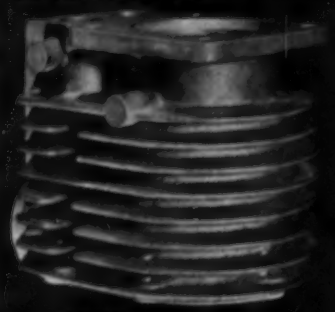
Infinite Size Adjustment

Size adjustment links are used for major adjustments, with final sizing controlled by size adjusting screws. This system, and changing helix angle bushings, assures rolling all threads as though the attachment were exclusively engineered for that particular work.

Precise Timing

A simplified system of roll timing ensures satisfactory rolling on the first operation. Only one gage is used for timing all threads rolled by each attachment. Rolls are correctly timed when roll lines coincide with the vertical of the curved timing gage segment (illustrated).

USER SAYS TAP LIFE UP 43% ON THIS THIN-WALLED CASTING



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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

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Let New Britain engineering supply a new approach

A machine is listed as an asset on your balance sheet, but if it slows your production and makes your costs too high, it's an asset you can't afford.

We invite you to call in your New Britain representative for a new approach to turning out the pieces that affect your profit margins. He has one of the broadest lines in the industry to choose from.

The following four pages contain examples of New Britain's *New* Approach.

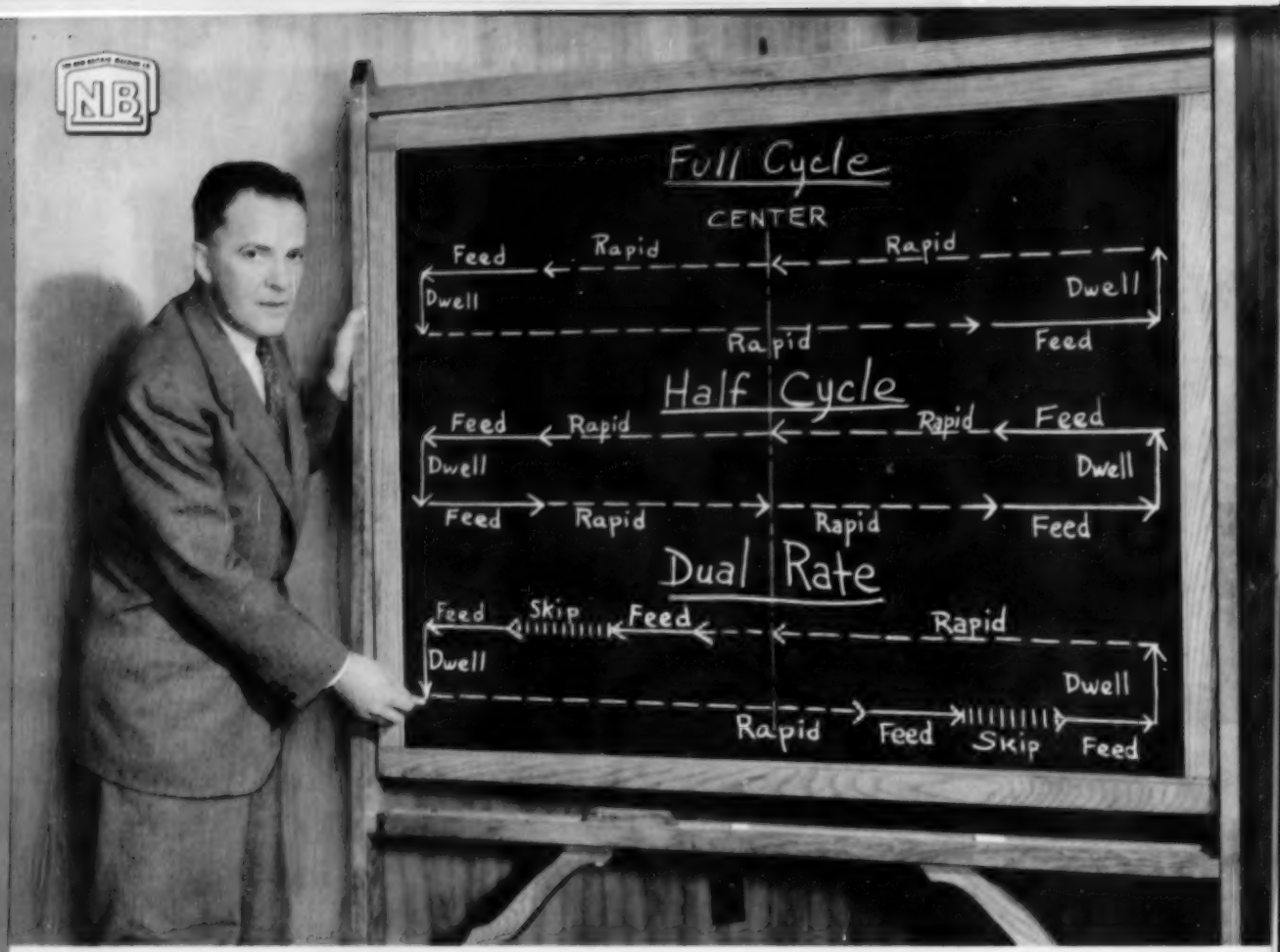
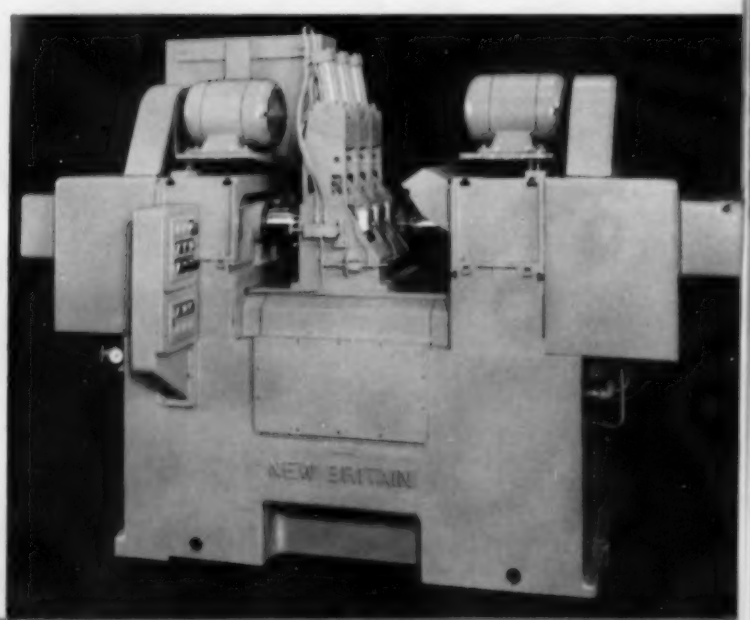


Diagram of versatility

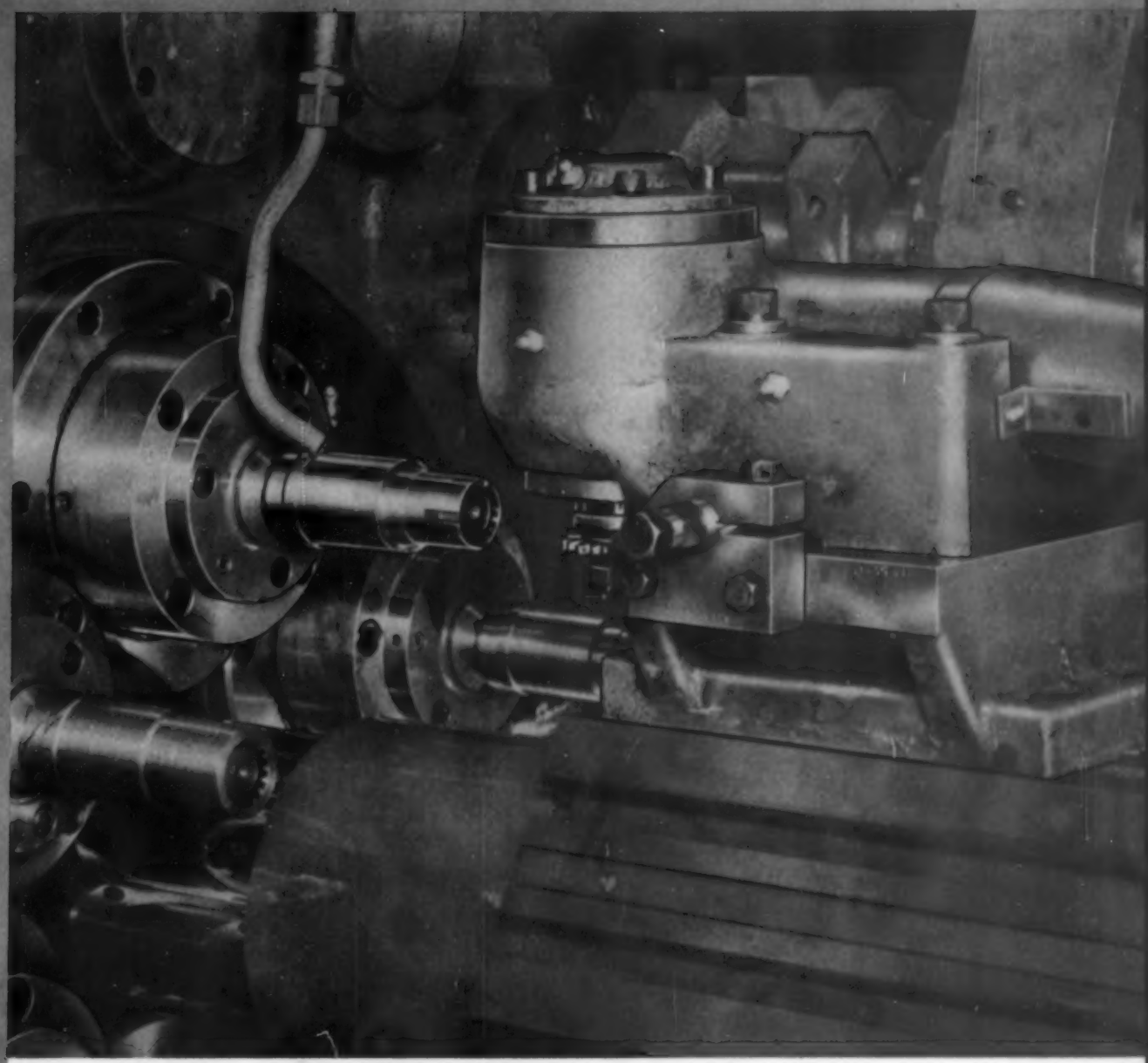
New Britain engineers can show you how to get two pieces per cycle (or double-end production) because of the flexibility of cycling they have designed into our double-end precision boring machines. The blackboard sketches show only three of many set-up possibilities.

FEATURES:

- **Completely separate hydraulic unit outside machine frame**
- **Automatic re-cycling or manual operation**
- **New Britain precision boring spindles**
- **Variable feed during cutting cycles**
- **Special fixtures and work holding devices**
- **One to four spindles at each end**
- **Tool or work rotating**
- **Coolants (optional)**



Model 50 New Britain Double-end Precision Boring Machine



The best machine is only as good as the engineer who tools it

How imaginative tooling can save time and money

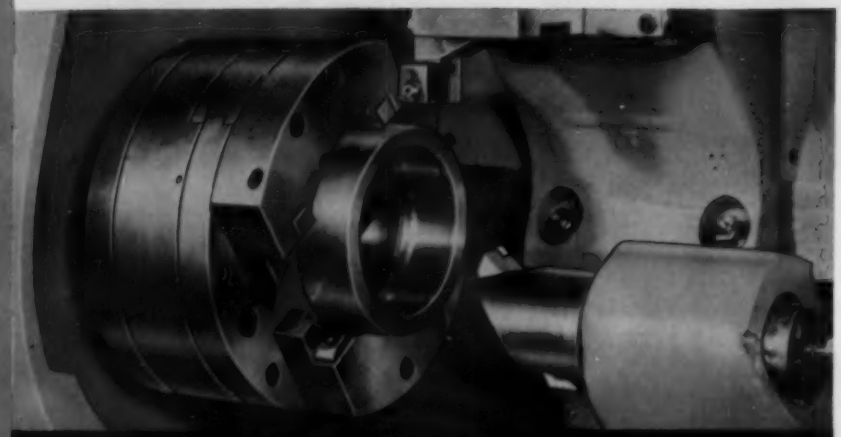
Skillful application of engineering principles to perform secondary operations on one machine can work wonders on *cost-per-piece:* Compare the cost of this milling attachment with the cost of a separate milling machine, *plus operator, plus overhead, plus maintenance, plus transfer time.*

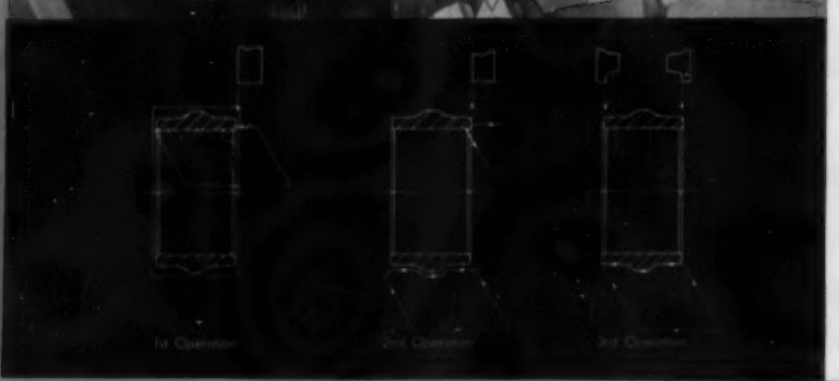
Opportunities like this for lower cost-per-piece exist in almost every plant, if you look for them. New Britain engineers are trained specialists, ready to cooperate in finding better methods.

See preceding two pages and two following pages for other New Britain *New's.*

New approach to bearing races

Single point turning on a New Britain +GF+ copying lathe





- Three New Britain +GF+ lathes replace four other machines
- No costly form tools to buy and maintain
- Change-over time reduced 90%
- Total job time cut more than 50%
- Savings quickly pay for new machines

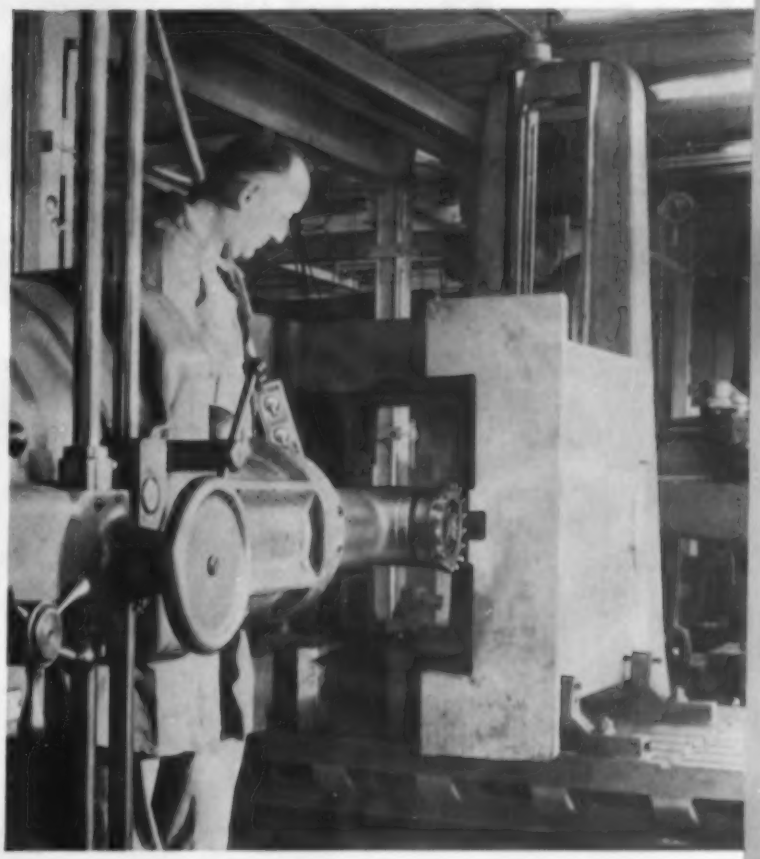
Easy way to learn about the New Britain +GF+ copying lathe

Ask your New Britain representative for a showing of the color motion picture "A NEW APPROACH TO COPY TURNING" in your own plant. Or write The New Britain Machine Co., New Britain, Conn.

The NEW BRITAIN

Lucas attachment produces better finish in a fraction of former time

LUCAS OF CLEVELAND

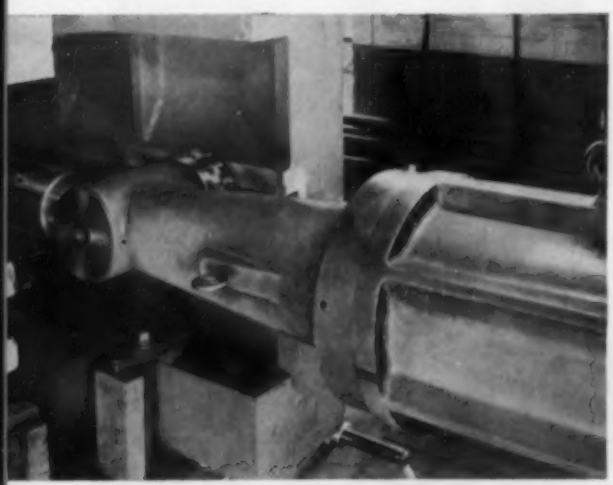


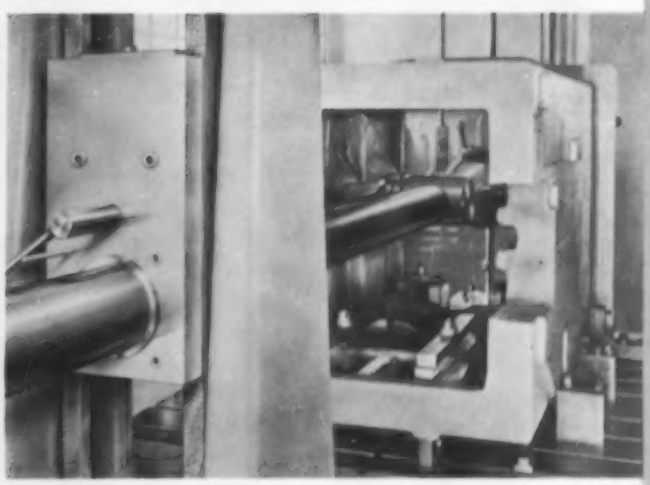
This Lucas Precision Horizontal Boring, Drilling and Milling Machine with angular milling attachment faces two opposing surfaces of this large casting with extreme precision. It machines both sides of the work with a simple 180° repositioning of the cutter — without resetting the job, or loss of accuracy.

Performing these fine finish operations with the cutter over *four* feet away from the front bearings of the machine is an extreme test, but there is no chatter, and this job has been running for four years to the manufacturer's complete satisfaction.

Ask your Lucas representative for help on the jobs other horizontal boring mills can't handle.

LUCAS MACHINE DIVISION
The New Britain
Machine Company
Cleveland 8, Ohio





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• LUCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES • NEW BRITAIN •GF• COPYING LATHES

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See the preceding four pages for other New Britain *New's*.

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Your Gould Field Engineer's one job is to see that you get maximum service from your batteries. He is factory-trained to instruct your own men as to correct maintenance routines and to help set up a simple record system for anticipating battery needs.

There's a Gould Field Engineer in your area. He's as near to you as your telephone. Call him. And when you see him, ask him for the new Gould Plus-Performance Plan material for your battery maintenance staff.

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Here a Cincinnati Press Brake saves 3 ways...

Built at The Maryland Drydock Company, for the Westinghouse Electric Corporation these giant condensers are some of the largest ever constructed.

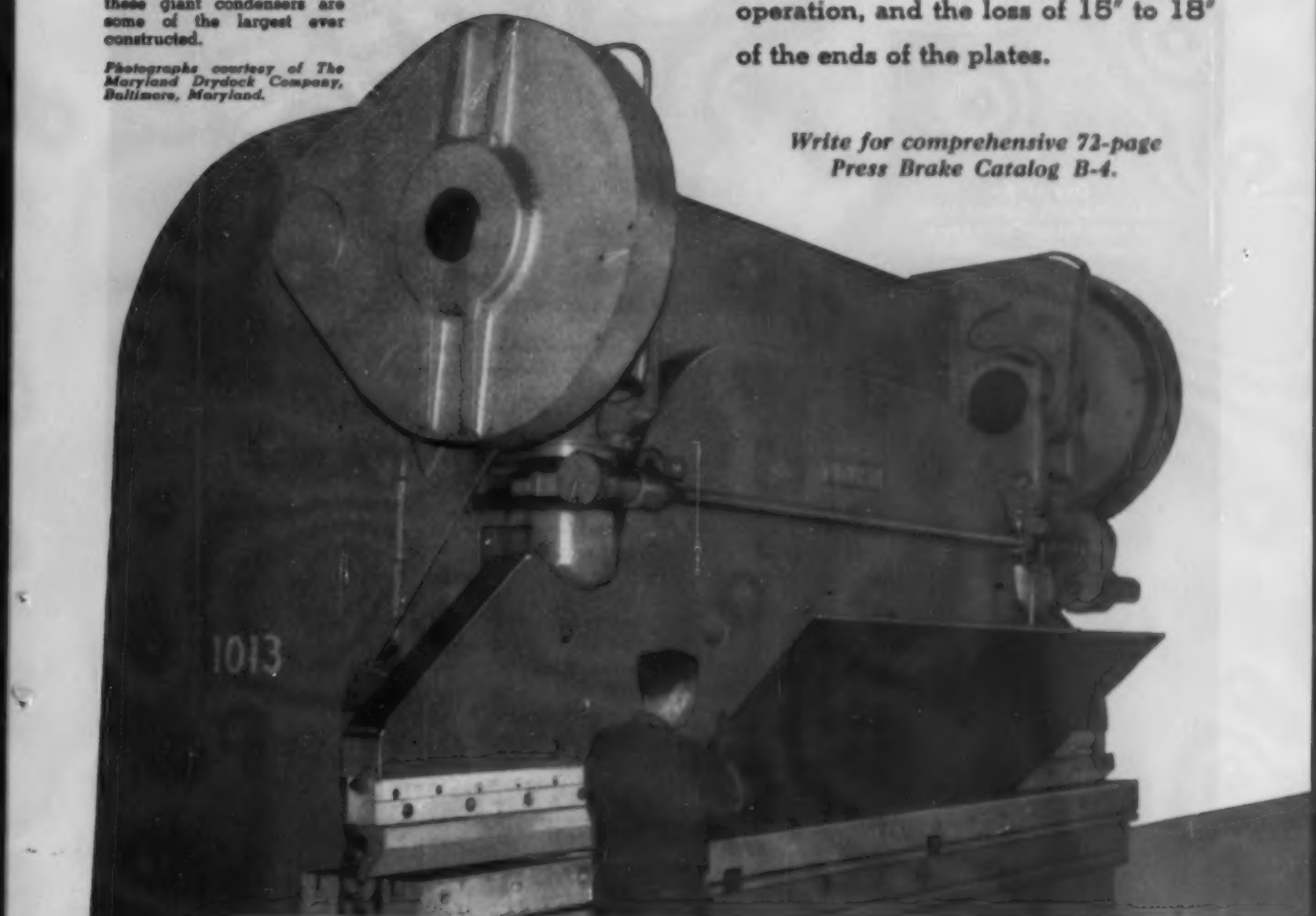
Photographs courtesy of The Maryland Drydock Company, Baltimore, Maryland.

- TIME
- NUMBER OF OPERATIONS
- MATERIAL

Crimping plate up to 3" thicknesses has cut roll-forming time in half at The Maryland Drydock Company.

The press brake crimps the ends of the plates with special dies, and has eliminated both the costly burning operation, and the loss of 15" to 18" of the ends of the plates.

Write for comprehensive 72-page Press Brake Catalog B-4.



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A Mechanical Eye...

Ford Cuts Tool Costs with Cross Machine Control Units

One of the Cross Machine Control Units at Ford Motor Company's Cleveland Engine Plant

(U. S. Patent Nos. 2679038 and D-163935. Others pending)

According to records, 221 Cross Machine Control Units in operation at Ford Motor Company Plants are assisting them greatly in improving tool trouble conditions.

One reason for this is that the Machine Control Unit provides a definite and convenient place for storing tools . . . tools which are pre-set so they can be placed in operation immediately without making machine adjustments.

Another reason is that the Cross Toolometer, an integral part of the Machine Control Unit, provides a standard for the performance of the tools, thereby enabling corrective action to be taken when necessary. The Toolometer dial is set to indicate the number of pieces which a given tool should produce. When the dial has reached that pre-determined figure, the machine automatically shuts down and the tools are changed. At the same time, other tools indicated by the Toolometer as approaching the end of their usefulness are also changed to take full advantage of the machine shut down.

The Cross Machine Control Unit is helping to keep Ford production going and is also assisting greatly in controlling tool life.

See us in Booth No. 1118 at the Machine Tool Show

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

CALENDAR
OF MEETINGS

Oct. 23-26, American Gear Manufacturers Association: Semiannual meeting, Edgewater Beach hotel, Chicago. Association's address: One Thomas Circle, Washington 5, D. C. Secretary: John C. Sears.

Oct. 23-26, American Hardware Manufacturers Association: National meeting, Marlborough-Blenheim hotel, Atlantic City, N. J. Association's address: 342 Madison Ave., New York 17, N. Y. Secretary: Arthur L. Faubel.

Oct. 23-26, National Association of Sheet Metal Distributors: Annual meeting, Marlborough-Blenheim hotel, Atlantic City, N. J. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

Oct. 23-26, Scientific Apparatus Makers Association: Fall meeting, the Cavalier, Virginia Beach, Va. Association's address: 20 N. Wacker Dr., Chicago, Ill. Executive vice president: Kenneth Andersen.

Oct. 24-25, Rail Steel Bar Association: Fall meeting, Sherman hotel, Chicago. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

Oct. 24-25, Steel Founders' Society of America: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Society's address: 920 Midland Bldg., Cleveland 15, O. Secretary: George K. Dreher.

Oct. 25-26, Steel Joint Institute: Semiannual meeting, Sheraton-Blackstone hotel, Chicago. Institute's address: Dupont Circle Bldg., Washington 6, D. C. Managing director, C. H. Luedeman.

Oct. 26-28, American Society of Body Engineers: Annual meeting and exhibit, Rackham Bldg., Detroit. Society's address: 100 E. Farnsworth Ave., Detroit, Mich. Secretary: E. A. Wilkie.

Oct. 26-28, National Industrial Conference Board: Annual conference, Waldorf-Astoria hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Oct. 26-28, Porcelain Enamel Institute: Annual meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1145 19th St. N.W., Washington 6, D. C. Secretary: John C. Oliver.

Oct. 27-29, Eastern States Blast Furnace & Coke Oven Association and Blast Furnace & Coke Association of the Chicago District: Annual joint meeting, Sheraton-Cadillac hotel, Detroit. Information: B. W. Norton, Shenango Furnace Co., Sharpeville, Pa.

Oct. 28-29, American Society of Tool Engineers: Fall meeting, Hotel Statler, Detroit. Society's address: 10700 Puritan Ave., Detroit, Mich. Executive secretary: Harry E. Conrad.

Oct. 30-Nov. 2, Packaging Institute: Annual meeting, Hotel Statler, New York. Institute's address: 342 Madison Ave., New York 17, N. Y. Secretary: L. V. Burton.

Oct. 31-Nov. 1, Magnesium Association: Annual meeting, Biltmore hotel, New York. Association's address: 122 E. 42nd St., New York 17, N. Y. Secretary: Jerry Singleton.

Oct. 31-Nov. 3, Society of Automotive Engineers Inc.: Transportation meeting, Chase hotel, St. Louis. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Oct. 31-Nov. 2, Wire Reinforcement Institute: Annual fall meeting, Ambassador hotel, Chicago. Institute's address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

Nov. 1-3, Grinding Wheel Institute and Abrasive Grain Association: Fall meeting, Hotel Statler, Buffalo. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

Nov. 1-3, Investment Casting Institute: Annual meeting, Sheraton-Cadillac hotel, Detroit. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

Nov. 3-4, National Fluid Power Association: Fall meeting, Edgewater Beach hotel, Chicago. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

HAVE YOU HEARD ABOUT THIS EXTRAORDINARY CLEANER?

It saves money in paint shops!

Oakite Rustripper is an alkaline material that strips paint, pigment residues and phosphate coatings from steel at the same time that it removes rust and oil.

It saves money in plating shops!

Oakite Rustripper removes rust or heat scale from steel at the same time that it removes oil and other soils. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

FREE

For more information about how Oakite Rustripper eliminates operations in paint shops and plating shops, send for one or both of the illustrated booklets listed in the coupon.

Here's the best shortcut in the field of organic finishing
Here's the best shortcut in the field of electroplating
OAKITE
SCIENCE

Technical Service Representatives in Principal Cities of U. S. and Canada

•

Export Division Cable Address: Oakite

OAKITE PRODUCTS, INC.
34E Rector Street, New York 6, N. Y.

Send me free booklet checked below:

☐ "Here's the best shortcut in the field of organic finishing"

☐ "Here's the best shortcut in the field of electroplating"

Name _____

Company _____

Address _____

MUSIC WIRE

BY

WASHBURN

has reached even higher standards of **QUALITY** than ever before. Our **CADMIUM** plated Music Wire especially merits your careful investigation if you are interested in superior corrosion resistance.

Our **QUALITY** will satisfy you . . . Our **SHIPMENTS** prompt, from ample stock . . . Our **INTEREST** in Customer requirements means "Once a Washburn Customer Always a Washburn Customer"

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

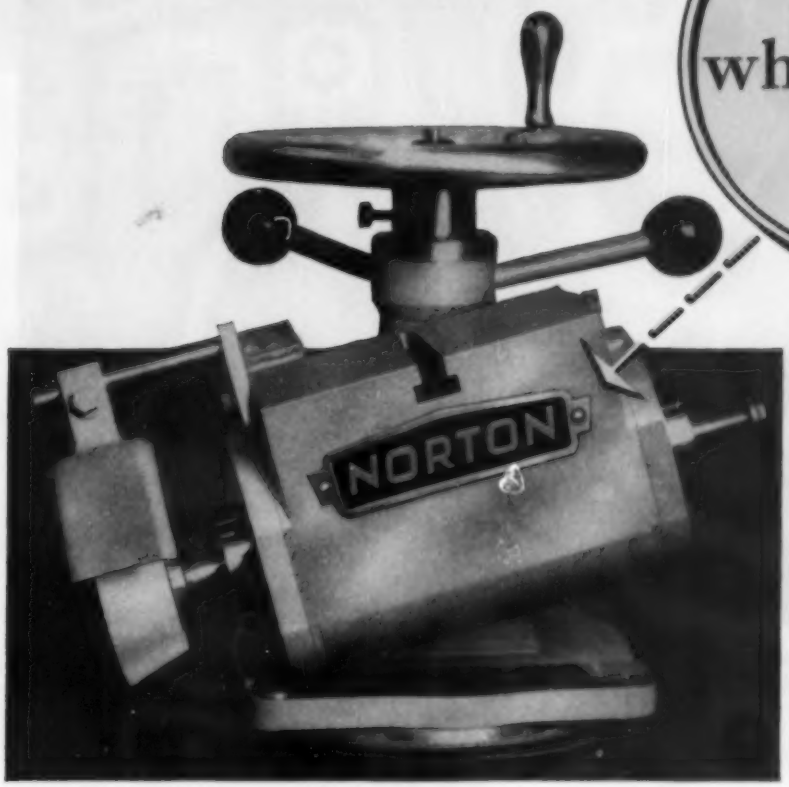
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

No other cutter and tool grinder does...

so many jobs so fast, so easily, as the Norton No. 20, because...

the wheel head tilts!



Greater versatility featured!

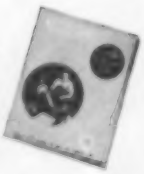
The Norton No. 20 cutter and tool grinder brings new speed and economy to the widest range of tool and cutter grinding jobs. It adds value to every piece of work it grinds . . . brings you more speed, more product value, more profit.

The wheel head can be tilted up to 15° above or below horizontal, and swivelled through 360° — simplifying such ordinarily difficult jobs as grinding taper reamers, step counterbores, form tools and milling cutters.

Other pace-setting advantages that make this Norton cutter and tool grinder easier to set up and more profitable to operate include: long table traverse and wheel slide travel . . . integral motor spindle . . . centrally located column elevating hand wheel . . . wheel slide graduated dials readable from any position . . . automatically lubricated table ways . . . electric equipment built to Machine Tool Builders' standards.

Only one of the world's most complete line of grinding machines, the No. 20 is a typical development of Norton's engineering leadership. *Remember — only Norton offers you such long experience in both grinding machines and wheels to help you produce more at lower cost.*

Why not investigate how the No. 20 can modernize and speed up tool and cutter grinding in your plant? See your Norton Representative for detailed information — and ask him about Norton cutter and tool grinders Nos. 1 and 2, and the BURA-WAY Grinder for automatic lathe tools. Meanwhile, write direct for Catalog 189, NORTON COMPANY, MACHINE DIVISION, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.



To Economize, Modernize with NEW

NORTON

GRINDERS and LAPPERS

Making better products . . . to make other products better

District Sales Offices: Hartford • New York Cleveland • Chicago • Detroit

Eighteen foot long springs are made on this Torrington Coiler by the Kokomo Spring Company Division of the Superior Machine Tool Company. Each spring weighs about 300 pounds.

Oil Tempered Spring Wire, produced in the Monessen, Pa., mills of Pittsburgh Steel Company, is ready to start its trip through spring-making operations. This coil has about 900 feet of wire.

Springs That Open Doors

▸ Kokomo uses dependable, high quality Pittsburgh Steel Wire to coil the biggest and the smallest in the business

Picture a spring 18 feet long, more than five inches in diameter, that weighs around 300 pounds. When you're making springs that big, you make sure you're using wire of good quality to keep production costs from skyrocketing.

Production problems multiply in the manufacture of these king-sized springs. Rejections are held way down when Pittsburgh Steel Com-

(Advertisement)

Springs ready for japanning are suspended from conveyor racks for a dip into paint, then they pass through an oven where the paint is baked 45 minutes at 275 degrees F.

In this looping operation, a double loop made of two coils is formed on each end of a 24-inch long extension spring used to pull up residential garage doors.

pany wire is used for this application. This is important since a single bad spring can cost as much as $100 in material, labor and machine time.

At the Kokomo Spring Company Division of Superior Machine Tool Company, MB Oil Tempered Wire from Pittsburgh Steel Company is used because uniform high quality is assured.

Kokomo Spring worked with the inventor of overhead garage doors some 30 years ago to produce the first garage door springs ever made. Today it accounts for 65 per cent of all garage door springs made in the United States. The company ships springs to 48 states, most of them made from wire 5/16 inch to 1/2 inch in diameter.

When Pittsburgh wire starts through coiling machines, production men know they will get an unbroken run of good springs that have the pitch they need. So production climbs while scrap and downtime are reduced.

Pittsburgh wire also cuts down the number of spring inspections which must be made. Users depend on it to produce spring after spring that exceeds specifications. When the number of inspections can be safely reduced, springs move more promptly along production lines.

Whether Kokomo Spring Company Division is making 18-foot long springs for a door manufacturer to cut into shorter lengths for industrial doors or making smaller, finished springs, it relies on Pittsburgh Steel Company to provide wire of high, uniform quality.

Oil-tempered wire from the mills of Pittsburgh Steel is coiled into compression, torsion or extension springs, given such finishing operations as grinding, looping or hooking the ends, and then is stress relieved in furnaces, japanned and shipped. Each individual spring is tested to make sure it meets customers' specifications.

Supplying industry with just the right kind of wire to make specialty products is regular procedure at Pittsburgh Steel where skilled wire drawers, with a half century of experience behind them, regularly produce special wires to meet customers' exact requirements.

Pittsburgh Steel can help you, too, speed production while lowering costs. Trained Pittsburgh salesmen are ready to furnish you with full information on prices and delivery or to discuss your wire problems. Just call the nearest district sales office.

Spring ends are ground to customers' specifications. Here, a Besly Grinder with 44 stations is grinding farm implement springs.

"Everything New But The Name"

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh San Francisco • Tulsa • Warren, Ohio. PLANTS: Monessen, Pa. • Allenport, Pa. Akron • Los Angeles Warren, Ohio • Worcester, Mass.

(Advertisement)

"Economical Buying of Screw Machine Products Now Calls for Greater Care in Specifications,"

says Leonard Schaffer, President, Mechanical Art Works, Inc., Newark, New Jersey

A few typical fine-finish, close tolerance screw machine products currently produced from ANACONDA Rods at the Mechanical Art Works.

"The tremendous versatility of automation in modern manufacturing has placed a bigger burden on the designer and buyer of screw machine parts," Mr. Schaffer explains. "The trend toward miniaturization has shifted many more parts to the screw machine. And the screw machine's ability to provide *tolerances* as close as .0005", and finishes heretofore obtainable only by centerless grinding, has left a tremendously wide choice in specifications."

Mr. Schaffer, a long-time user of Anaconda products, says, "I can count on the uniform machining characteristics of ANACONDA Rods from batch to batch, which is important for both quality and economy in my business."

For complete data on composition and machinability of standard ANACONDA Alloys, standard specifications, weights and dimensions of standard rods, write for Publication B-14. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 3383

A few of Mr. Schaffer's suggestions to buyers of screw machine products for keeping costs down.

Wherever possible, the largest diameter of the piece should correspond to a standard stock rod diameter.

Avoid fancy shapes calling for expensive forming tools.

Use hole diameters obtainable with standard tools.

Allow commercial tolerances if possible, otherwise specify tolerances no closer than necessary.

Specify Standard National Coarse or National Fine Threads wherever possible.

On external threads, cutting full threads close to a shoulder is expensive —and may be unnecessary.

Tapping blind holes close to the bottom is difficult and costly.

Specify free cutting material unless special physical properties are required, then select the best machining material containing those properties.

ANACONDA® RODS FOR SCREW MACHINE PRODUCTS

When a GISHOLT BALANCER tells you the story —you don't have to translate it!

Note that dial reading! It does more than you may suspect.

Unlike other balancing machines, it does not merely indicate amount of unbalance in arbitrary units and leave it to the operator to interpret in terms of correction. Gisholt Balancers can tell the story *directly* in terms of correction units. No translation needed. No computation. No charts or graphs.

Because of their infinitely variable sensitivity, Gisholt Balancers are easily adjusted for the job at hand. Correction units such as ⅛" lengths of wire solder, 1/64" depths for a certain size of drill, washers of a specific weight, etc., can be used. Readings, in terms of these units, are shown directly on the amount meter.

Think what that means in time saving alone! Yet this is only one of many ways Gisholt enables you to set—and maintain—higher standards for your balancing work.

If your product includes the use of rotating parts, by all means check Gisholt for the most recent information on balancing.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

DYNETRIC BALANCERS GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Two-year-old test driver reports on "Nylok" Nuts

"Ever watch a two-year-old like me in action? I'll give any piece of equipment a good shakedown and testing. Did it recently on my new Taylor-Tot. Figured it would be a cinch to shake it apart in nothing flat. But I'd never come up against 'Nylok' Nuts before. I gave it the full treatment—bumps, bounces, jars and jolts. The 'Nylok' Nuts held tight. Now I know why 'Nylok' Nuts mean positive locking."

The Frank F. Taylor Company had a young fellow like this in mind when it designed and engineered the Taylor-Tot. At several critical points Republic "Nylok" Nuts are used to assure positive locking even under severe shock, vibration and tension.

Republic "Nylok" Nuts lock whether seated or not. This means painted surfaces and soft metals are protected because "Nylok" Nuts do not have to be pulled up tight. Positive locking is assured in any position wherever you stop wrenching. Yet they can be backed off easily for maintenance or inspection of parts. And then can be re-used.

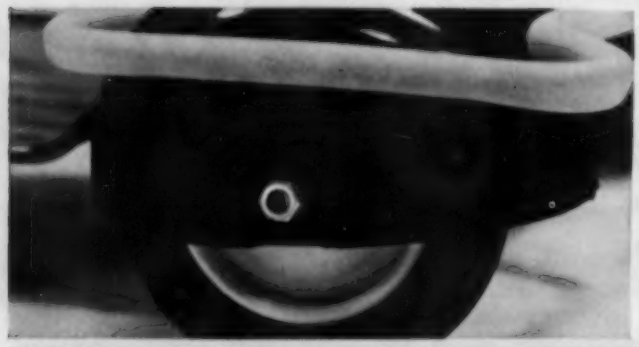
They go on easily, too, because either end is up. No special tools, lubricants or techniques are needed. Use them manually for piece-work. Or feed them automatically at full production speeds.

Think how Republic "Nylok" Nuts might be applied to your product or equipment. Why not make an actual test? Write us for a sample nut indicating size required. Available in Finished Series tapped ¼" thru 1", Finished Thick Series tapped ¼" thru ½", and Heavy Series tapped ¼" thru 1".

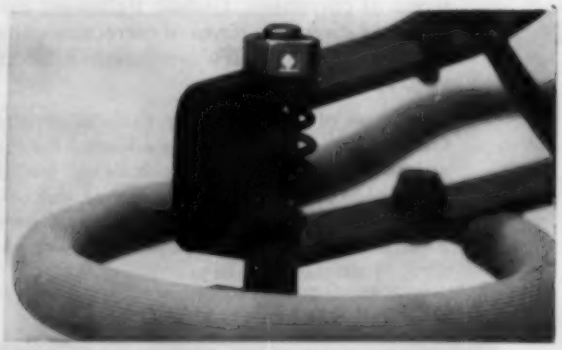
"Nylok" Nuts are but one of more than 28,000 regular types and sizes of high-quality fasteners made by Republic's Bolt and Nut Division.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



Republic "Nylok" Nuts are used on rear wheels to assure positive locking and for ease of assembly. One-piece, cold-forged nut goes on fast from either end. There is no fumbling to find the right side. No special tools are needed for assembly.



Positive adjustment of spring compression on the Taylor-Tot's shock absorbers is accomplished with Republic "Nylok" Nuts. A nylon plug in one face forces the nut tight against the opposite threads of the stud as the nut is turned on.

MANY BUDDING YOUNG TEST DRIVERS take their first rides in bassinets made of Republic ENDURO Stainless Steel. Use of ENDURO in their construction gives these wheeled bassinets their attractive appearance. Provides adequate strength without excess weight. Makes them easy to clean and keep clean. Assures long life with minimum maintenance. It will pay you to find out more about ENDURO for your product. Mail the coupon.

REPUBLIC STEEL CORPORATION
3120 East 45th Street • Cleveland 27, Ohio

☐ Please send a sample "Nylok" Nut Size _____

☐ Please send more information on ENDURO® Stainless Steel

Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* ____ *State* ____

NEW... AMERICAN MONOTRACTOR for Automatic Handling

The NEW American MonoTractor will fit precisely into any overhead handling system for automatic transfer of materials.

This new unit offers these advantages:—

1. Duti-Rated Life Time Gearing.
2. Speed Range from 35 to 350 F. P. M.
3. Horsepower Range for ¼ to 2 H.P.
4. Any Standard NEMA Motor.
5. Any Type Motor Brake Can Be Applied.
6. Operates on Any Smooth Flat Flange Track.

This precision built tractor unit offers continuous trouble-free transfer of any type of carrier for power propulsion. American MonoRail engineers offer wide experience in the application of these units. Let them help you solve your automatic handling problems.

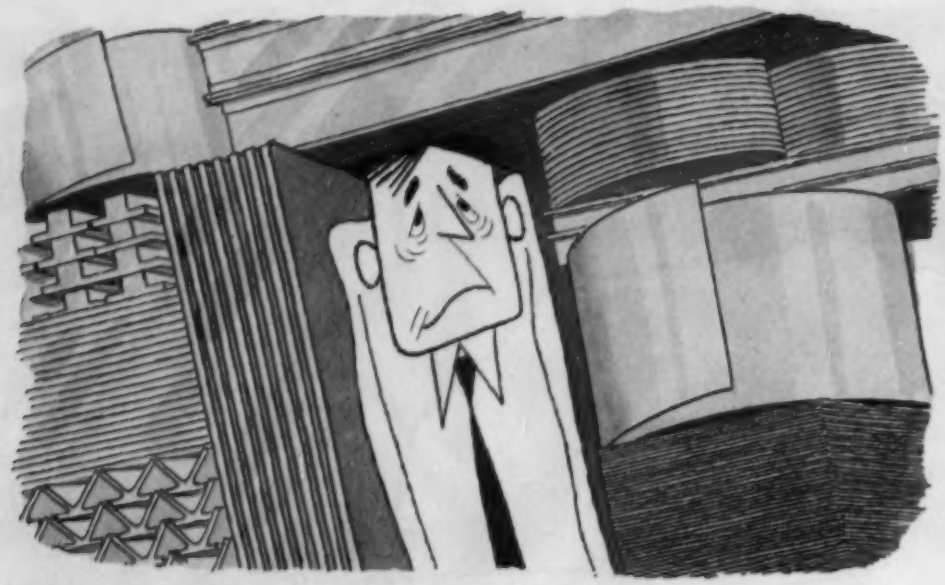
AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

If you need a helping hand.....



If you need more elbow room...

If you need more space and don't know where to get it, your Kaiser Aluminum Distributor can probably help. By drawing on his large inventory, you can use much of your present storage space for production. Or, if you're tight on cash, just eliminate your storage space and thus reduce your overhead.

think of your Kaiser

If you've bitten off more than you can chew...

If you find yourself with more work than you can handle, your Kaiser Aluminum Distributor can help. He's geared to meet your emergency needs, to go to work for you the minute you call. He stocks a wide variety of aluminum and can provide you with almost any size, shape or alloy—cut to your needs.

If you're stuck with high costs...

You can reduce your raw material outlay and cut your handling and insurance costs by drawing on the large stocks of your Kaiser Aluminum Distributor. You can use *his* inventory as your own . . . because he can give you machine-side delivery as you need it.

Aluminum Distributor

All these services mean more profits for you because they help lower your costs!

Call your Kaiser Aluminum Distributor today! You'll find his name on the next page!

Kaiser Aluminum Distributors

ATLANTA, GEORGIA
Warehouse Division, Atlantic Steel Co.
Phone: Emerson 3451

BALTIMORE, MARYLAND
Hill-Chase Steel Co. of Maryland
Phone: Peabody 2-7300

BEAUMONT, TEXAS
Standard Brass & Mfg. Co. Phone: 4-2641

BIRMINGHAM, ALABAMA
Hanna Steel Corporation Phone: 9-2127

CHICAGO METROPOLITAN AREA
Fullerton Steel & Wire Co. Phone: Merrimac 7-2700
Korhumel Steel & Aluminum Co., Evanston, Illinois
Phone: Ambassador 2-6700
Miratile Mfg. Company Phone: Hudson 8-2200
(Serves House Trailer Industry only)

CINCINNATI, OHIO
Morrison-Drabner Steel Co. Phone: Wabash 1-4480

CLEVELAND, OHIO
Copper & Brass Sales, Inc. Phone: Endicott 1-6757
Nottingham Steel Company Phone: Atlantic 1-5100

DALLAS, TEXAS
Delta Metals, Inc. Phone: Logan 7443
Earle M. Jorgensen Co. Phone: Riverside 1761

DAVENPORT, IOWA
Nichols Wire & Aluminum Co. Phone: 3-1895

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Copper & Brass Sales, Inc. Phone: Lorain 7-3380
Steel & Aluminum Products Corp.
Phone: Vermont 6-9285

GRAND RAPIDS, MICHIGAN
Copper & Brass Sales, Inc. Phone: Empire 1-6681

HONOLULU, T. H.
Permanente Cement Co. Phone: 5-2541

HOUSTON, TEXAS
Earle M. Jorgensen Co. Phone: Orchard 1621
Standard Brass & Mfg. Co. Phone: Capitol 6531

INDIANAPOLIS, INDIANA
Hubbell Metals Inc. Phone: Hickory 9261
F. H. Langsenkamp Company Phone: Imperial 4321

KANSAS CITY, MISSOURI
Hubbell Metals Inc. Phone: Baltimore 7760

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Earle M. Jorgensen Co. Phone: Lorain 7-1122
Reliance Steel Company Phone: Adams 3-3193

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Korhumel Steel & Aluminum Corp. of Wis.
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MINNEAPOLIS, MINNESOTA
Korhumel Steel & Aluminum Co.
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NEW ORLEANS, LOUISIANA
Orleans Steel Products Co., Inc.
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T. E. Conklin Brass & Copper Co., Inc.
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A. R. Purdy Company, Inc., Lyndhurst, N. J.
Lyndhurst: Phone Webster 9-8100
New York: Phone Chelsea 3-4455
Newark: Phone Humboldt 2-5566

OAKLAND, CALIFORNIA
American Brass & Copper Co.
Phone: Higate 4-2366
Gilmore Steel & Supply Co.
Phone: Glencourt 1-1680
Earle M. Jorgensen Co. Phone: Higate 4-2030

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Hill-Chase & Company, Inc.
Phone: Delaware 6-5400

PITTSBURGH, PENNSYLVANIA
William M. Orr Co., Inc. Phone: Churchill 2-3000

PORT ARTHUR, TEXAS
Standard Brass & Mfg. Co. Phone: 5-9377

PORTLAND, OREGON
Eagle Metals Inc. of Oregon Phone: Tuxedo 5201

SAN FRANCISCO, CALIFORNIA
Gilmore Steel & Supply Co.
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Eagle Metals Company Phone: Lander 9974

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General Metals, Inc.
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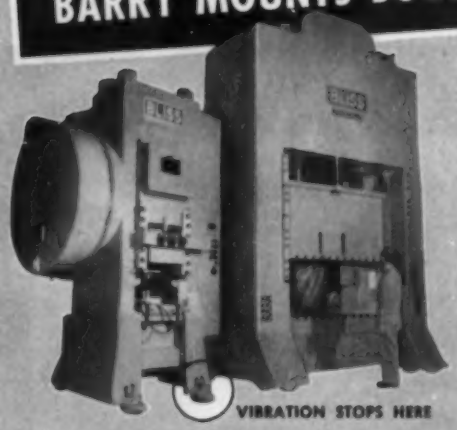
42 MANUFACTURERS *at the Tool Show* PROVED BARRY MOUNTS BOOST PRODUCTION — CUT COSTS



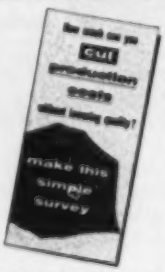
400-TON BLISS PRESS "FLOATS" ON BARRY MOUNTS. With no special foundation, or floor preparation, this knuckle-joint press weighing 26,500 lbs. was installed, leveled, and ready for demonstration in less than 30 minutes. The saving in cost of installation for this and two other giant presses far exceeded the cost of the Barry Leveling Mounts used — with the plus value of freedom from frame stresses met in lagged down installations.

CONSISTENT HIGH-QUALITY PRODUCTION to extremely close tolerences was demonstrated in the Sheffield gear and thread grinder exhibit without interference from the pounding of huge heavy-impact presses in adjacent show spaces. With Barry Leveling Mounts isolating the grinders from floor-borne shocks, one operator said, "This machine is performing excellently. I'm getting *no* rejects".

YOU CAN GET MORE and BETTER PRODUCTION

and lower costs in YOUR plant — even if you have problems as tough as any met by machine-tool builders at the Chicago show.

This FREE check-chart shows proved cures for such dollar-eaters as:



- Frozen machine layouts
- Too much downtime
- Machine duplication
- In-line maintenance
- Building-borne vibration
- Slow machine speeds
- Idle space
- Excessive noise

Write for free copy of Barry Plant Survey Chart SA-755 and Product Bulletin 546.

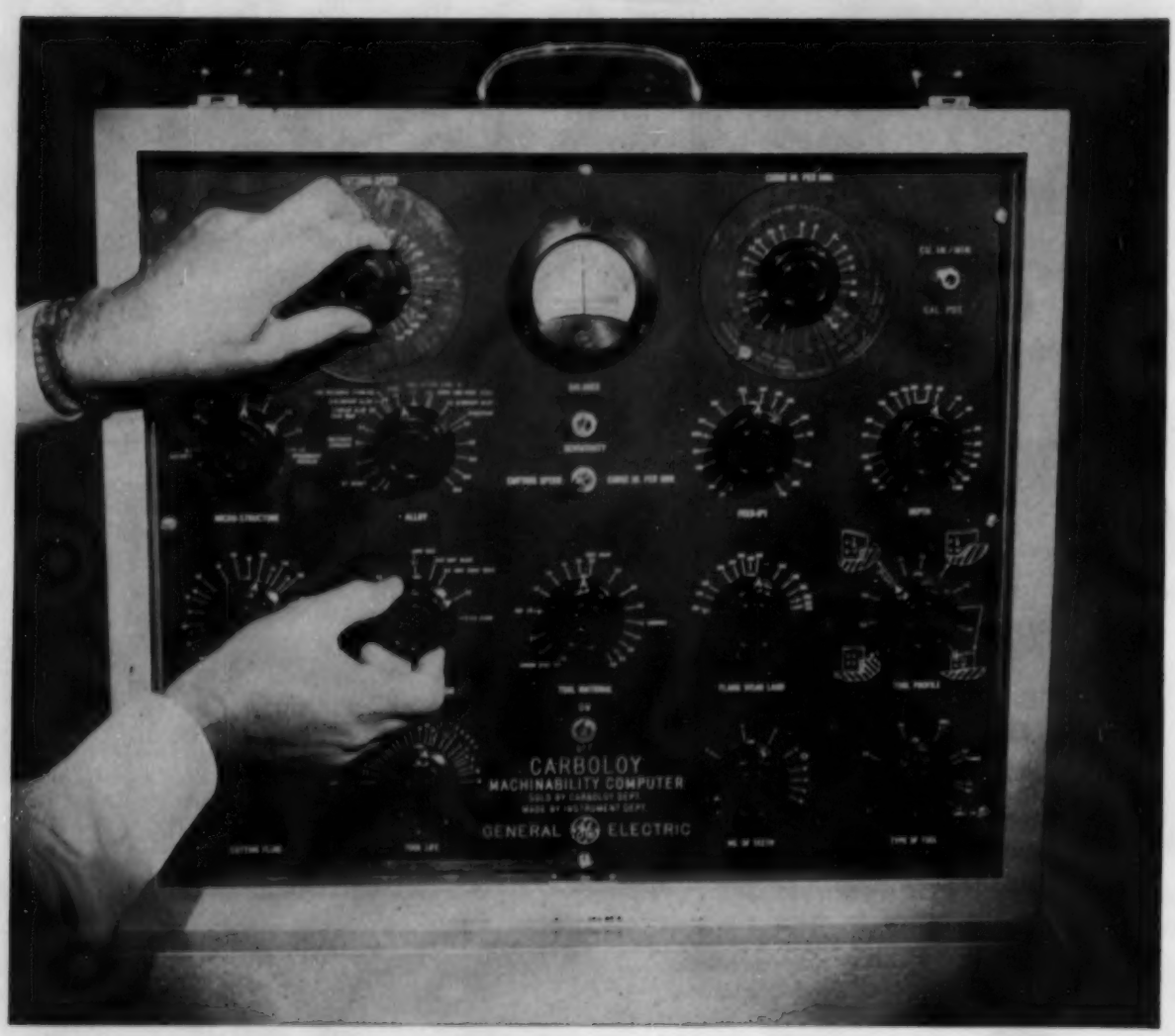
SOLD THROUGH INDUSTRIAL DISTRIBUTORS

Barry's expansion program offers engineering opportunities at all levels in all departments.

HIGH-SPEED, POWER SHEAR PRODUCTION by Famco was made easy to display by use of Barry Mounts. Installation and leveling was a matter of a few minutes. Then, with day after day operation at up to 85 strokes per minute, the shear did not "walk" . . . while vibration-sensitive lathes and grinders in nearby booths were reported unaffected by the high-speed, heavy impact.

BARRY CONTROLS incorporated **926** Pleasant St. Watertown 72, Mass.

Carboloy announces the
CARBOLOY MACHINABILITY



To find an unknown variable like speed, output, or motor horsepower, simply set dials according to known information. Then turn dial of unknown variable until meter (top, center) balances at zero setting. Computer instantly shows what happens when any of the variables listed below are changed.

Computes values for any of these 19 operating variables:

Material Cut:
- Work material
- Microstructure
- Hardness
- Surface condition

Cutting Tool:
- Tool material
- Tool life
- Flank wear land
- Tool profile
- Type of tool
- Number of teeth

Cutting Conditions:
- Cutting fluids
- Feed
- Depth of cut
- Cutting speed
- Motor horsepower
- Cubic inches per minute
- Unit horsepower
- Work diameter
- R.P.M.

COMPUTER

- **New engineering tool solves complex machine setup problems in seconds, instead of hours**
- **Shows how to vary cutting conditions to increase machine, cutting tool, and operator efficiency**

In seconds, the low-cost Carboloy® Machinability Computer calculates the effect of 19 basic machining variables on machine performance, tool life, and output.

In seconds, it shows optimum operating conditions for any metal-cutting job, eliminating wasteful experimental runs.

In seconds, it shows how to improve existing setups by the right variation of operating conditions.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

Results are numerical – requiring no further interpretation from the direct-reading dials. Accuracy is assured – based on more than a year's testing on in-plant applications at key General Electric plants.

Handles many jobs

The Carboloy Machinability Computer handles basic information on operating conditions, type and condition of work material, style and material of tools. The computer accurately predicts cubic inches per minute removed, tool life, and required machine horsepower. It shows how changing speed, feed, depth of cut, or tool material will affect these and other variables.

The Computer solves – in seconds – problems that would be otherwise impractical because of the large number of machining variables involved.

The Carboloy Machinability Computer was developed and proved in the field by a team of Carboloy and General Electric engineers, under the direction of Dr. W. W. Gilbert, of G.E.'s Manufacturing Services Division.

The Computer is portable (weighs only 32 lbs.), battery-operated, and measures 21" x 7" x 20".

The price of the Carboloy Machinability Computer is ... **$495.** (f.o.b. factory, Detroit)

Whether your plant is large or small, the Computer can bring you immediate benefits. Send the coupon, below, for complete information.

TYPICAL IN-PLANT COMPUTER APPLICATION

PROBLEM: Setting up 16", 10-HP lathe to turn hot-rolled 1020 steel bar with 10" diameter, to get tool life of 1 hour.

SOLUTION: Starting from scratch on a new setup, *days* could be used by experienced tool men to find a satisfactory set of operating conditions . . . with no assurance that the result would be the best possible. With the computer, the optimum setup was established, and the effect of changing key variables compared, in less than *15 minutes*.

BENEFITS: Computer turned lengthy setup time into valuable production time. On this job alone, the savings gained through days of extra production, plus savings in manpower costs, would more than equal the cost of the computer.

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11141 E. 8 Mile Ave., Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

Please send me more information on the Carboloy Machinability Computer.

Name_____

Company_____ Title_____

Address_____

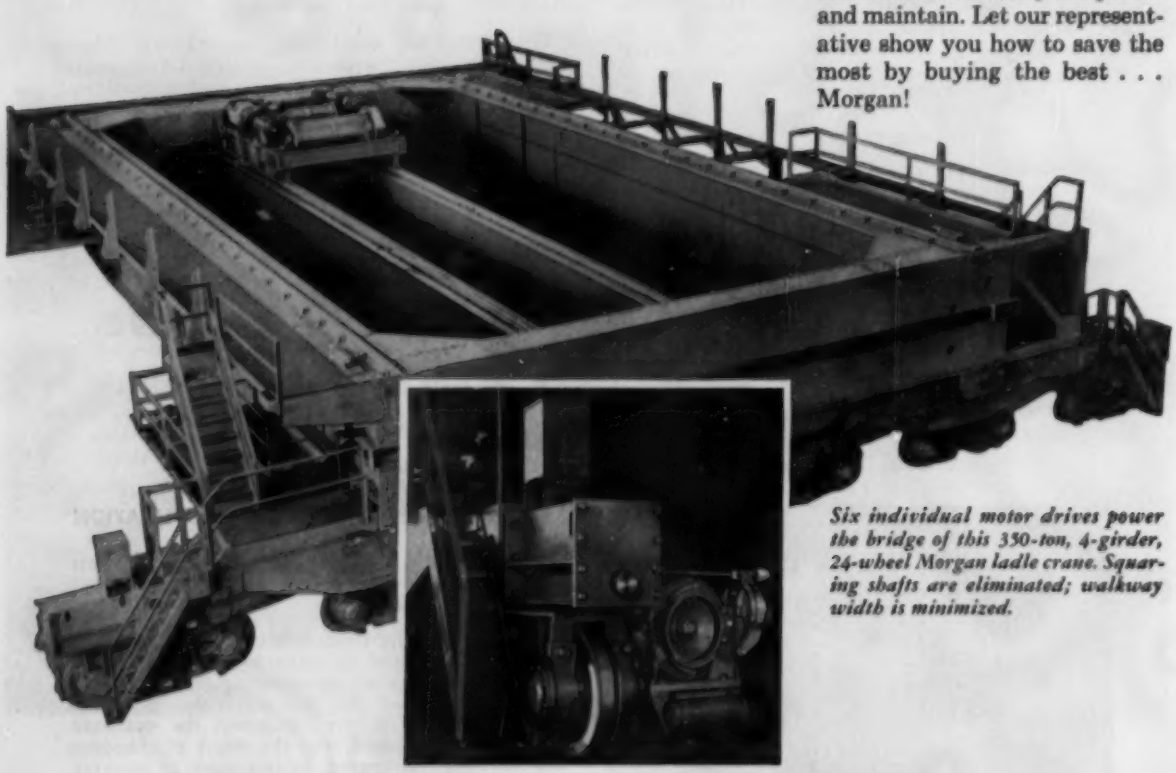
City_____ Zone_____ State_____

How Morgan "points the way" to smoother crane operation

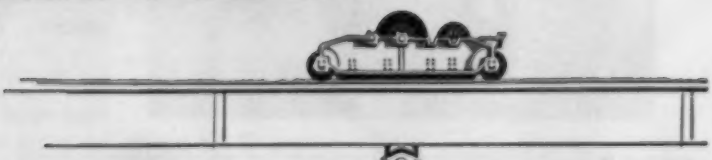
● **INDIVIDUAL MOTOR DRIVES** were pioneered by The Morgan Engineering Company to improve crane bridge travel . . . to provide smoother operation, to reduce the number of moving parts, to simplify maintenance, to eliminate dead weight of drive shafts, to streamline the crane.

These individual motor drives are another vital link in the chain of features that make Morgan cranes the best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Six individual motor drives power the bridge of this 350-ton, 4-girder, 24-wheel Morgan ladle crane. Squaring shafts are eliminated; walkway width is minimized.



THE MORGAN ENGINEERING CO. *Alliance, Ohio*

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

"This is a time to try men's souls" — *moving time!* Curtains to hang, fixtures to fasten, a lot of odd jobs. And a lot of modern-minded citizens are still *losing their minds* over old-fashioned slotted screws. Wobble . . . drop . . . try again. Teeter . . . *crash!* . . . get the doctor! And sweep up the mess, including all the screws with burred and broken slots.

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Want it proved? Just ask American, the country's longest-experienced screw manufacturer, and prime producer of Phillips Screws for industry. Here's the engineering know-how, the volume capacity, the thorough reliability that can give you a degree of cost-control in your assembly departments beyond your "screwiest" imaginings! Write:

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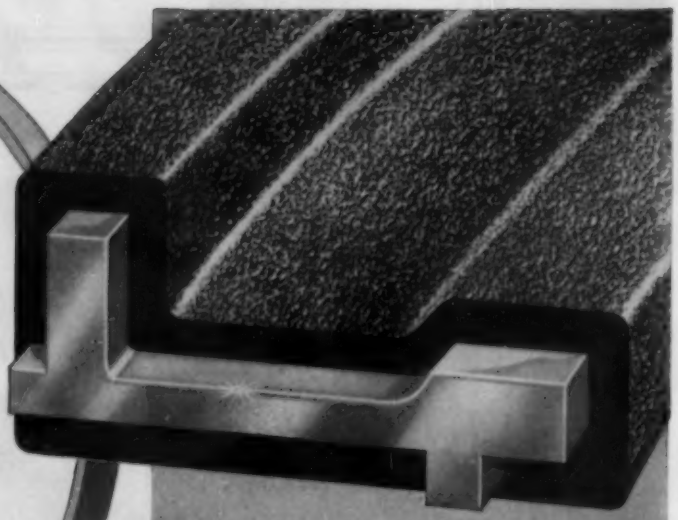

A ring originally designed to be machined from a casting that weighed 390 lbs. cost the buyer $280.00. Working with American Welding the part was re-designed to be machined from a rolled and flash welded ring made from a special mill-rolled shape.

These triple savings resulted:

1. Basic cost of the ring, before machining, was reduced to $59.37 — a savings of $220.63.
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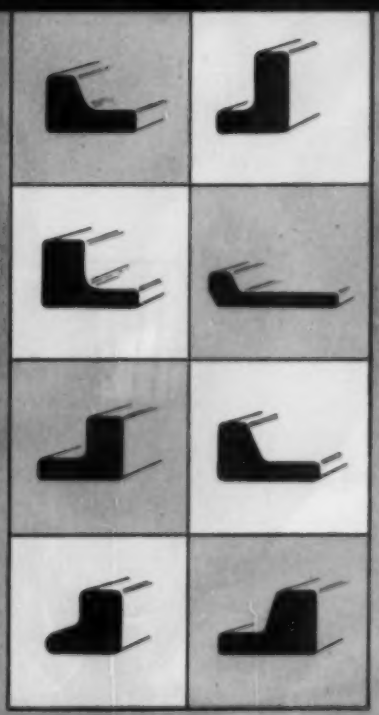
3. The contour shape of the mill-rolled section saved additional time and money on finished machining.

*Actual case from a leading manufacturer of jet aircraft engines.

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES AVAILABLE FROM AMERICAN WELDING



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Metalworking Outlook

High Level for Capital Outlays

Capital goods spending will continue to move up in 1956, says Sydney D. Maddock, president of C.I.T. Corp. He expects a further increase in installment buying of production machinery, since payments can be geared to take full advantage of fast depreciation schedules. This combination, he believes, will permit more companies to set up long-term plans for plant modernization.

Railroad Spending To Turn Up

Railroads must lay at least $6 billion on the line for capital improvement over the next five years, says William T. Faricy, president, Association of American Railroads. A major factor will be some 75,000 freight cars costing about $525 million each year. Some other items: Roadway and structure needs, $365 million a year; locomotives, $200 million a year; passenger cars, $110 million a year. Mr. Faricy estimates that the railroads will have to boost net income by 21 per cent to meet the cost.

Housing Market: Solid

Tighter consumer credit and the news that September housing starts are off "more than seasonally" have been proffered by some economists as evidence of a shaky housing market. Here's one answer from Melvin H. Baker, board chairman of National Gypsum Co.: "1956 dollar volume will about equal this year's projected record of $14.6 billion." His reasons: Homes will be bigger; most buyers will be able to meet the new credit terms because of rising employment, higher wages. National Gypsum will put $75 million into new plant before 1960.

Wilson Tightens Defense Spending

Charles E. Wilson, defense secretary, hopes to cut $500 million from defense spending in fiscal 1956 and 1957, bringing outlays down to the present target of $34.5 billion. About $200 million of the saving will come from tighter administration of major procurement and production. There will be no change in over-all policies; nor is any reduction in military manpower planned.

Flood Area Procurement

Procurement by the Defense department in the New England and Middle Atlantic flood areas totals about $81 million for the six-week period ended Sept. 30. In addition, a total of $27 million in disaster relief is to be provided by the Corps of Army Engineers for repair and cleanup work. Of this, $12.7 million was allocated just before the new floods struck. Look

for further substantial government outlays in the area while rebuilding is being completed in the next few months.

More Titanium for Airframes?

In the future more titanium will be used in airframes than in jet engines, reports John H. Garrett, chairman of the Defense department's steering group on titanium. He explains that expanded use of the metal will come within three years, dropping the price of mill products from current levels of $12 to $13 per pound to about $5 per pound. Considerations: 1. Sponge prices will have to plummet from $3.95 to $2 a pound. 2. Tonnage consumption will have to be several times higher than present levels.

Coming: Manganese Pilot Plant

Strategic Materials Corp. will use about two-thirds of the funds obtained from a recent stock issue (340,000 shares at $10) to build a pilot plant for the production of ferromanganese from low-grade manganese ores (see STEEL, Oct. 17, p. 80). It will be near Niagara Falls, Ont. Production will be under way within eight months.

Military Will Take More Metal

During the first quarter of 1956, the military will increase its take of metals. The Office of Defense Mobilization's allotments show military stainless steel requirements at 24 million lb, an increase of some 1.5 million lb over the scheduled take for the fourth quarter of this year. This additional amount may be offset by a decrease in consumption of stainless by the Atomic Energy Commission. The military also will be looking for more copper, aluminum and types of steel other than stainless. AEC will register small reductions in all cases except brass mill, copper wire mill and carbon steel products.

More Two-Car Families

Some 60 million passenger cars will be sold during the next ten years, predicts F. C. Reith, general manager of the Mercury Division, Ford Motor Co. Record-breaking sales this year have not been "borrowed from the future," he states, "but have helped to form the basis for future sales." Crux: More and more people are willing and able to become car owners, two-car families or purchasers of more expensive automobiles.

Straws in the Wind

General Motors Corp., will add another $4.5 million to its expansion plans for General Motors of France, bringing the total to $8 million . . . The U.S. Air Force has more F-104As on the way. Lockheed Aircraft Corp. has the order, which will bring the firm over $100 million . . . Arthur G. McKee Co. will design the stern of the first atomic surface ship; Westinghouse Electric Corp., will build the atomic propulsion plant.

(Advertisement)

What's New

IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

Leaded plates—Now lead has been added to E-Z-Cut plate. As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, takes a sounder weld and polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, New E-Z-Cut is much cleaner steel, free from sulfide stringers. First stocks include thicknesses up through 3".

Biggest stainless steel plates now available from Ryerson stocks. This is the first time that 96" wide plates in thicknesses up to and including 1"—and heavier plates in 80" widths have been carried in stock at plants from coast to coast. Types on hand: 304, 304L, 316 and 316L. Next time, save welding on your big jobs with these bigger plates.

Delivered prices on tubing—Something new in simplified pricing is featured in a booklet just published by Ryerson. For buyers in the 16 metropolitan areas where large Ryerson tubing stocks are located, the booklet gives total delivered prices. There's no figuring to do—no factors to add. For buyers outside these metropolitan areas, a separate book gives prices per 100 feet and transportation charges. And beside every price in all books is a figure that tells you quickly and clearly when you can get a lower price by ordering just a few feet or pounds more. Copies on request.

Give steel-walled buildings a new look with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets in mansard pattern also available.) The mansard pattern of widely spaced corrugations makes an unusually attractive wall and loss in total sheet area from pattern formation is slight—only about the same as with 2½" corrugated—previously the most economical pattern you could use. Maintenance-free stainless in mansard pattern also has many industrial and miscellaneous-architectural-ornamental applications. New Bulletin 70-5 on request.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel, has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through 9½". So heavy shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

Stainless pipe for welding applications—Now there's no need to wait for mill deliveries or to use expensive stabilized types when you want stainless pipe suitable for welding. Type 304L pipe, an extra low carbon type that eliminates the need for stress relieving after welding, has recently been added to Ryerson stocks. Size range: Schedule 40 welded pipe in commonly used sizes from ¼" through 2". Schedule 40 seamless in 3", 4" and 6" pipe sizes.

Supply situation on bars, structurals, plates and sheets—Heavy demand makes it difficult to keep all sizes of these products always on hand. However, we do have thousands of tons of steel ready for quick shipment and, since our stocks are being replenished continually, sizes that are not available today may be on hand tomorrow. So call us next time you need steel.

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JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK • BOSTON • PHILADELPHIA • CLEVELAND
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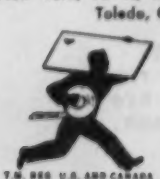

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RELIANCE
Job-Fitted
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COLD ROLLED STRIP STEEL
Coils • Cut Lengths • All Tempers

SHEETS
Cold Rolled • Hot Rolled • H.R. Pickled
Galvanized • Long Terne
Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

Looking for
Man-Size
Cold Rolled Strip?

Most cold strip mills shy away from the heavier gauges. As the thickness goes beyond .062" or .083", the number of sources gets thinner; over .150", they're few and far between.

Why is this so?

For one thing, it's a matter of heavy enough equipment to stand the gaff. Another thing is experienced enough manpower. There's a knack in manipulating thick-steel hot bands and cold strip coils and cut lengths.

Our strip mills happen to have what it takes on both counts. Heavy strip (up to about 3/16" at Detroit, 5/32" at Hamden, Connecticut) is "duck soup" for us. We have the husky-enough pickling machines, cold reducing mills, slitters, edgers, flatteners, cut-up lines and related equipment.

DSC stripmakers are *heavy-gauge minded*. Man-size strip is all in our day's work—and has been for over 30 years. Fact is, we're equipped and manned to take good care of most requirements for cold rolled strip, either thick or thin.

How about your own stamped or roll-formed jobs that could profitably use cold reduced flat rolled steel in regular bright or satin finish, job-fitted temper and tight thickness tolerance?

For quick help, call your nearest DSC Customer Representative. He'll be glad to work with you.

Customer Satisfaction is our No. 1 Job

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GENERAL SALES OFFICE—DETROIT 9, MICHIGAN

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DSC MILL PRODUCTS

Hot Rolled and Cold Rolled Sheets
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October 24, 1955

Know Your Markets

Manufacturers' sales in the metalworking industry in 1940 totaled $23 billion. Five years later they were $62 billion. This year they will run close to $125 billion.

In 1940, there were 28,000 metalworking plants in the United States. Today, there are more than 56,000.

National income was $81 billion in 1940. It now is running at a rate of $321 billion.

Population in 1940 was 131 million. Today, it is more than 165 million.

Those simple market facts illustrate a simple point: Today's markets are growing and shifting so rapidly that knowledge of yesterday's market is of little more use than yesterday's newspaper. Decisions based on yesterday's market facts cannot fit today's conditions.

What happened in the last 15 years will be equaled or exceeded in the next 15 years.

Reasonably current market facts are being collected and made available by a large number of agencies which go to great pains and expense to insure accuracy and completeness. They are not being used as much as they might be. Vergil D. Reed of J. Walter Thompson Co., says: "It has always shocked me to see the wealth of collected facts that are simply ignored. Even worse, their existence is rather generally unknown."

To make the sources of market facts better known, the editors of this publication have compiled a guide (page 91) of the more accessible data. Such information is available to anyone. The cost is trifling.

Market facts can be used in many ways. The American Marketing Association suggests the most common: 1. Forecasting sales. 2. Analyzing market potentialities. 3. Analyzing distribution. 4. Mapping sales territories. 5. Analyzing sales performance. 6. Locating new or branch plants. 7. Locating warehouses or other outlets. 8. Determining samples in marketing research studies.

That there remains a lag in time between which market facts are collected, collated and published cannot be denied. Like the modern warplane, market facts tend to become obsolete before they come off the production line. Modern surveying methods and new computers are reducing the delay.

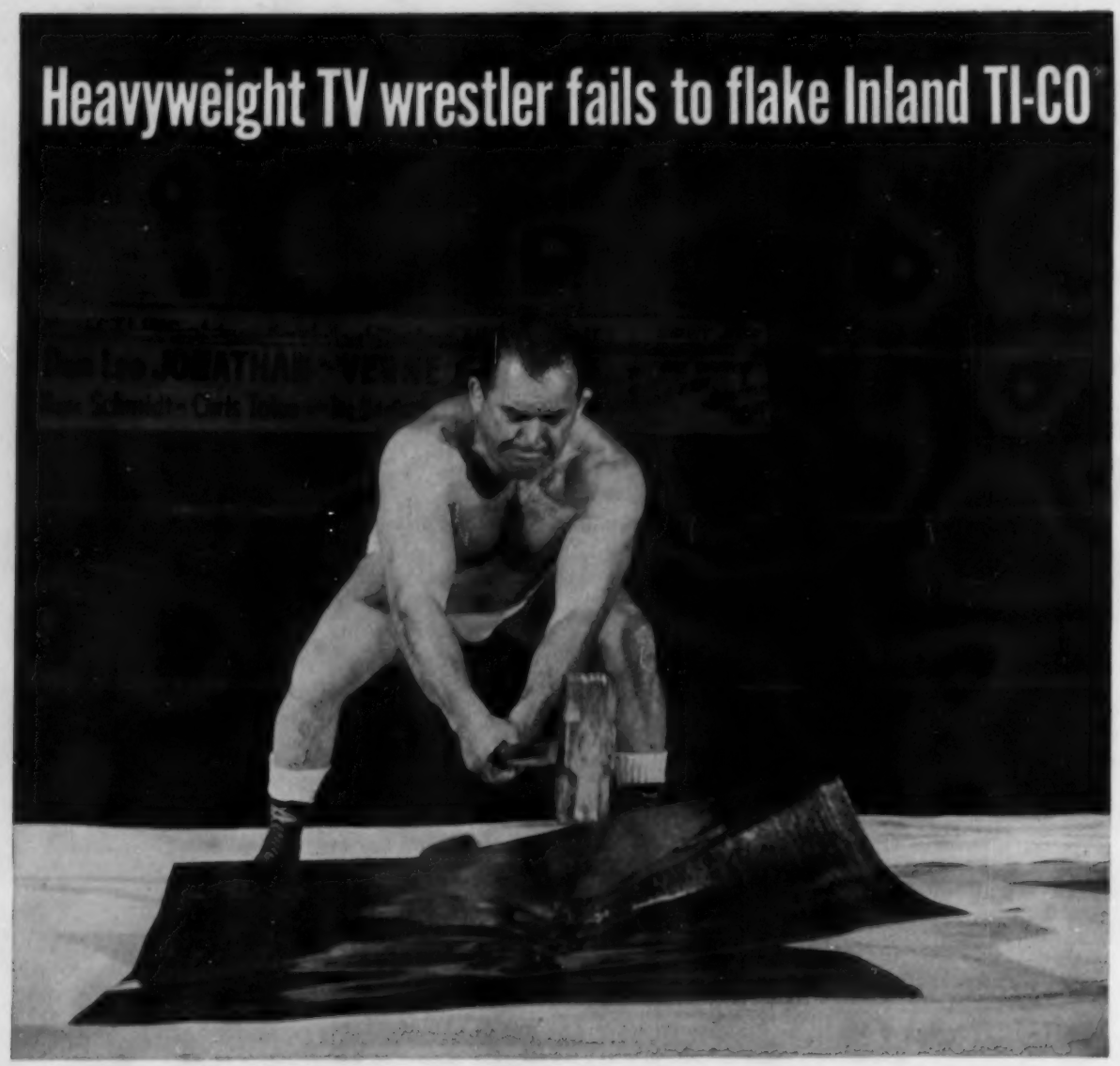
For most practical purposes, market facts available through the government, private research groups, business papers or your own records provide a solid basis for marketing decisions.

Are you making the best possible use of them?

Walter J. Campbell

MANAGING EDITOR

Heavyweight TV wrestler fails to flake Inland TI-CO



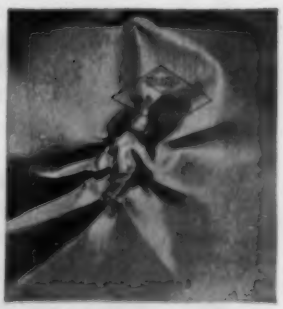
Well-known television wrestler, **Zack "Old Ironsides" Malkov,** *one of the roughest, strongest "grunt and groaners" in the business, puts his full 235 pounds behind a 10 lb. sledge hammer in an attempt to break the zinc coating on a sheet of Inland* TI-CO *Galvanized Steel.* TI-CO *rolled with the punch, the sheet gave but the coating stayed put!*

Not many applications require the coating on TI-CO to take the punishment of repeated blows by the business end of a sledge hammer! We think this unusual demonstration does illustrate, however, the ability of TI-CO to take even the toughest fabricating operations . . . stamping, drawing, crimping, double-seaming, brake forming or even spin drawing . . . without cracking or flaking of the zinc coating.

TI-CO's secret is in the patented Sendzimir process which produces a galvanized sheet with a tightly adhering zinc coating that flows with the base metal as it is being fabricated. This flexible, uniform coating means that products made with TI-CO are easier and cheaper to produce because re-dipping after forming is eliminated. And they stay serviceable and good-looking longer.

It will pay you to specify Inland TI-CO *for all your galvanized steel requirements.*

INLAND TI-CO . . . with the zinc coating that rolls with the punch.



Close-up of TI-CO *after sledge hammer test. Shows severity of strain on sheet and complete absence of cracking or flaking of the zinc coating.*

WANT MORE FACTS? *Write for our new* TI-CO *catalog. It's a word-and-picture story of* TI-CO *in action.*

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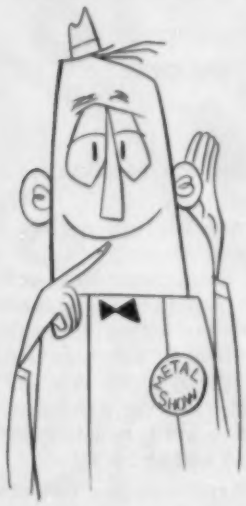


"Our dollar sales will double by 1960, then double again by 1965."

—Makers of heavy electric motor controls

"Vacuum and metals will form the most rewarding metallurgical marriage of the next decade."

—David Stokes, F. J. Stokes Machine Co.

"Look for a scientific break-through that will bring the cost of electronic computers within the reach of the little company."

—Research professor

Optimism keynotes Metal Show as industry parades . . .

New Methods, Materials

SOME 4000 new or improved products relating to metalworking will be introduced this month—and next month and the month after that.

Many of the best thoughts of the past year on materials, heat treating, testing and welding were on display at the Metal Show last week in Philadelphia's Convention Hall.

Crowd — Some 75,000 visitors pored over the 435 exhibits at the affair. Corridor consensus: The technological accent of the future will shift more and more to new or improved materials in product development.

"We're near the end of our current book on materials technology," explained one exhibitor. "It's time to write a new one." That it's being written is indicated by the scope of the American Society for Metals papers, the emphasis upon the subject at exhibits, the talk about it at the show and the Philadelphia hotels.

Examples — Linde Air Products Co. showed its flame-plating process for applying thin coats of tungsten carbide to enhance the qualities of the base metal. Introduced only three years ago, more than 100 applications already exist. New customers for the Union Carbide & Carbon Corp. Division's flame-plating service are coming in at a rate of 30 to 40 a month.

Carboloy Department of General Electric Co. revealed at the show that its experimental cemented oxide tool material for use on high speed machine tools will be available on a limited basis by Jan. 1. By using a consumable electrode process in vacuum melting, Allegheny Ludlum Steel Corp. says it will have a potential capacity to produce 1 million lb of high temperature superalloys a month. It disclosed that the new equipment it has installed already has a capacity of 250,000 lb a month.

Titanium — Corridor talk about titanium was extensive. Consensus: Titanium is making a comeback. Makers still have technical problems, but they are being licked. "Sales for this quarter look like they'll be the best for any three months in our history," says one producer.

The comment of many a speaker at the technical sessions: Teach your metallurgists more about economics. Said Carboloy's W. A. Reich, manager of advance development: "Because America has been so rich in materials, the metallurgists up until now have been using the cream on the top. But depleted reserves are taking us down to the skimmed milk in many cases. Economics must be added to the other technical tools available to the metallurgist, to show him how best to use that skimmed milk."

Reason Why — The "skimmed milk" problem is one reason why industry is spurring itself to create an unparalleled boom in new products, particularly in new ways to treat materials. Of all money spent on product research and development in the history of the U. S., 45 per cent ($17 billion) has been put on the line in the last five years.

A record $3.9 billion is being spent this year. Some results of those expenditures were on display in Philadelphia last week.

Automakers Boost Stainless

Detroit automakers are giving stainless steel output a helping hand this year.

Richard E. Paret, specialist for the American Iron and Steel Institute reports that mill shipments to the automotive industry are expected to hit a record-breaking 135,000 tons.

Previous high was 1953 when total shipments of stainless steel amounted to 128,000 tons. First half shipments this year were 73,000 tons, 60 per cent more than a similar period in 1954.

"Big reason for this increased demand for stainless steel depends on how much trim designers want on new model cars," Mr. Paret explained.

Although some stainless is used in carburetors, exhaust valves and other applications where heat and corrosion resistance is needed, largest use is for exterior and interior trim. Most of the tonnage consists of cold-rolled strip, but stampings also are used.

Oregon Gets Steel Furnace

Southern Oregon's first electric steel furnace will be installed by Laughlin Alloy Steel Co., Medford, Ore.

It is the first of several furnaces which will manufacture steel al-

loys and castings for industrial uses.

Capacity is 10,000 lb of metal. Five tons of carbon or stainless steel can be produced every two and a half hours. Laughlin plans to charge the furnace with low-grade native ores, such as chromium, manganese and tungsten.

The furnace was rebuilt by Green Electric Furnace Co., Seattle.

ODM Grants More Tax Permits

Bethlehem Steel Corp. will get a fast tax write-off permit for half of its Sparrows Point, Md., facility expansion.

Cost of the new expansion is $30 million. The Sparrows Point plant makes steel plate for ships.

The Bethlehem Steel permit topped the list of $93 million worth of certificates issued by the Office of Defense Mobilization between Sept. 22 and Oct. 5.

Among other write-offs: Pima Mining Co., Pima County, Ariz., 75 per cent of $8.8 million for copper mining facilities. Rare Metals Corp. of America, Tuba City, Ariz., 80 per cent of $2.3 million for uranium ore processing facilities.

A write-off certificate for 40 per cent of $8.6 million went to New York New Haven & Hartford Railroad for bridges, trackage and communication equipment.

1956 To See New Records

U. S. Steel Corp. spokesman says business spending on new plant and equipment will be a major stay next year. Soft spots are seen in durable goods

"NEXT year should bring us up to almost a $400-billion economy."

That's the future that Bennett S. Chapple Jr., assistant executive vice president-commercial of U. S. Steel Corp., Pittsburgh, painted for the tenth annual conference of the National Institute of Government Purchasing.

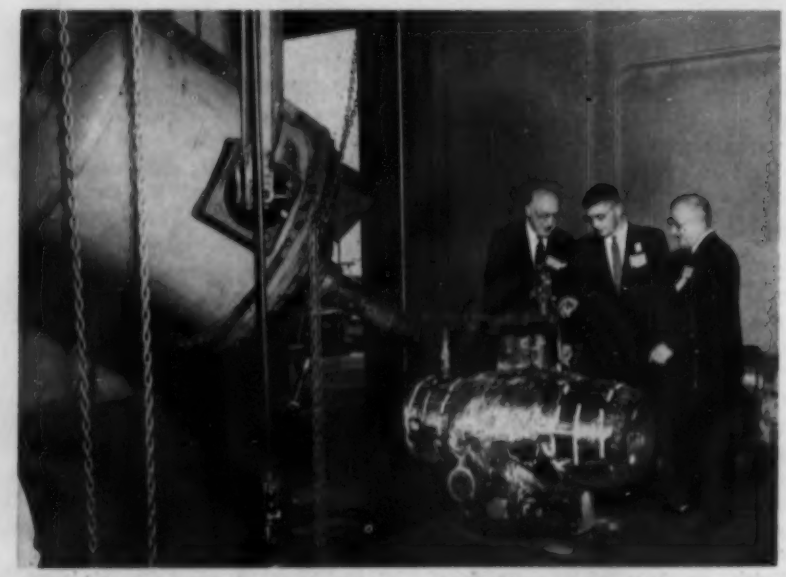
Strong Point — "Businessmen, generally, will spend more on new plant and equipment and on inventories than during the recent past, as they seek to expand industrial capacity in line with our new levels of peak demand," says Mr. Chapple. Though he also believes that the value of consumer soft goods and services will show a marked increase, he isn't so optimistic about consumer durables and residential construction. Both, he predicts, "will decline somewhat from their present highs, in order that the market can catch its breath a little and digest the record output of recent months."

This is the broad framework within which Mr. Chapple says U. S. Steel will be planning next year:

Pattern — The upsurge of production and demand will continue through most segments of the economy. But the rate of increase will be slower during the next six months than it has been during the last year. There is a strong possibility that the upward curve may flatten out completely during the second half of 1956.

Mr. Chapple singles out credit, inventory status and the general confidence of business and the public as critical shading in this growth picture. He regards credit as the key. Enough must be available, he says, to meet the needs of growing population and higher standards of living, but not so much that an inflation spiral starts up. He points to the recessions of 1949 and 1953 as being started by inventory speculation. This problem is still unsolved, he warns.

Mr. Chapple pins his final faith to a belief in the American people. He believes that we have discovered the "linkage between our material prosperity and our national ability for intelligent teamwork." He believes that we will continue to have faith in it.



G-E's X-ray Unit Spots Flaws in Turbine Castings

This 1 million volt x-ray machine is used to inspect turbine castings. It is located in General Electric's turbine-generator plant at Schenectady, N. Y.

Inland Buys Barrel Company

Inland Steel Co., Chicago, has bought Cleveland Steel Barrel Co. Price: 18,463 shares of Inland stock. The purchase is subject to government approval.

Cleveland Barrel's main plant (Cleveland) and a smaller one in Greenville, O., will be merged into Inland's Steel Container Co. Div.

L. B. Hunter, president of the container division, said the purchase would strengthen Inland's market areas and broaden its product line by adding heavier gage barrels, stainless barrels and pails.

Inland will retain Cleveland Barrel's management.

Assembly line sealing speeds making of 113 types of batteries at Willard Storage Battery Co.

Battery Makers Head for Record Year

MORE THAN 34 million batteries for cars, trucks, busses and tractors will be sold this year. That's 2 million over the 1950 record.

N. R. Farsje, assistant vice president of Gould-National Batteries Inc., predicts sales this year will hit $400 million. Next year, he says, they will be even better at $425 million. Replacement sales alone are expected to jump 500,000 batteries.

Surprise—Battery makers didn't expect the boom year. In forecasting sales they assumed car production would be 6 million. That figure was topped the first week in October and car builders expect to build another 2 million cars this year.

More important to battery sales is the replacement market. You can bet that Joe at the corner gasoline station is selling more batteries this year than last. With more money in his pocket, the average customer will buy a new battery for protection; last year he probably gambled on a recharge job to get him through the winter.

About 73 per cent of automotive batteries are made for replacement. New cars and trucks account for about 25 per cent of sales. New tractor batteries and other uses make up the remaining 2 per cent.

But autos aren't the only users of storage batteries; they take about 80 per cent of storage battery production. The remainder is divided this way: 4 per cent for aircraft and marine uses, 4 per cent for industrial trucks, 3 per cent for motive power, 1 per cent for farm and emergency lighting. Communications and other uses account for 8 per cent.

Signal lighting and air conditioning service for railroads are significant uses. Some of these batteries take up to 4 tons of lead.

No. 1—The storage battery industry is the biggest customer of lead miners. This year about 430,000 tons of the 850,000 tons used in the U. S. will go into batteries.

The outlook is for increased use of lead in batteries. The Association of American Battery Manufacturers estimates that the average auto battery this year will contain 23 lb of lead. For the lead salesman, that's a welcome change from the 1950 to 1954 period, which saw a steady decrease of from 21.6 to 20.25 lb of lead in the average battery.

12 Volts — Practically all new cars have 12-volt systems. That's because increased compression ratios demand a hotter spark for operating efficiency. The increased electrical load (some cars have as many as 13 electric motors) is another reason for the change.

The 12-volt battery contains about 1¾-lb more lead than its 6-volt brother. But compared with the battery of 15 years ago, today's gives more spark, lasts longer but uses less lead to do the same amount of work. Reason: Improved oxides, better grid alloys, better mechanical insulation.

Lead consumption will continue to rise as more 12-volt batteries are sold. Not many replacement batteries are sold until a car is two years old. But along about 1960 the 12 volt will outsell the 6 volt.

IBM's New York data processing center, first of many

Computers: Show and Tell Will Sell

"FOR two years, we've been running a bid-estimating job for a heat-exchanger company. Every sale it makes requires a modification of one of its 24 models. Using engineers to estimate bids often was more expensive than manufacturing costs. We showed them how to save, now they've leased their own computer."

That's how D. R. Mason, manager, electronic data processing service, International Business Machines Corp., New York, sums up the double payoff of computer centers. They provide the most economical way for metalworking to tailor its problems to computer techniques. Also, they are the best sales tool computer people could have found.

Like Topsy—More than ten commercial service centers cover the country. Both IBM and the Remington Rand Division of Sperry Rand Corp. have them in New York, Washington and Los Angeles. Remington Rand has another in Philadelphia. Logistics Research Inc. and Electrodata Corp., California firms, have centers in the Los Angeles area. They are in addition to installations at Battelle Memorial Institute and similar organizations.

More are coming. Bendix Computer Division of Bendix Aviation Corp. was new to the business in 1952. Though it has sold only five units so far, it's already building a center in Los Angeles and plans more. Burroughs Corp., Detroit, hopes to get into the service center business. Logistics Research is looking at Chicago, Washington and New York with an eye to expansion, and one of its customers may set up contract computing in the Southeast. IBM will have a new center in the Texas area within a month. Remington Rand plans three more by the end of '56.

Handy—You don't have to be in a service center city to take advantage of computers. A Pittsburgh steel company uses IBM's New York center to figure the best combination of ingredients and processing procedures for its alloy steels.

Bought outright, "medium" computers cost $60,000, plus. A big one may run more than $2 million. The service center gives a manufacturer a chance to find out what he can get for his computer dollar before buying. Here's how charges shape up: Rental on a medium unit runs between $70 and $100 an hour. Other units come as low as $15, or as high as $445 an hour.

Payoff—Success of the center as a sales tool is reflected in snowballing orders for equipment. Logistics Research, which installed only one computer last year, will have moved seven more by December. By the year end, its production will be stepped up to two systems a month. Electrodata's sales volume will jump from $1 million last year to more than $3 million in 1955. Marchant Calculators Inc., another California company, also notes rapidly expanding sales. Remington Rand says sales in the last 90 days amounted to $15.5 million for its Univac, adds that rentals came in for another 8 Univacs and 50 medium-sized machines. IBM reports orders for 34 large and 50 medium machines. It adds up to an equation you don't need an electronic brain to solve: Show and tell will sell.

High volume outshines technological rat race as . . .

Auto Supplier Profits Climb

COMPETITION is keen. But there's little doubt that auto suppliers are riding the crest of the auto boom despite a trend toward integration by the automakers.

Henry Ford II notes this: Integration at Ford since the war is considerably more than before the war. Yet Ford has increased the value of its outside purchases from $1 billion in 1946 to over $3.2 billion in 1955.

Big Buyer—Ford estimates it still buys about 40 per cent from outside sources. The figure is probably not far off for other auto firms as well, when automaker construction and equipment buying is recalled. In 1950 Ford alone consumed an estimated 15 per cent of machine tool output.

Traditionally, however, the auto supplier is thought of as the man who supplies only parts for cars.

Quick Change — Increasingly, suppliers have felt the press of competition. One forging supplier describes today's situation as "a technological rat race."

His point: Materials and methods change so rapidly that the supplier may find his price cut in two by some new technique. Forgers and foundrymen perhaps face the strongest threat. Parts like the Buick flywheel, once a ferrous casting, now consist of a stamped disc with a rack gear rolled around its periphery and welded. Packard's Ultramatic in 1956 will have a diecast aluminum transmission case rather than an iron casting.

Turnabout — Shell molders are giving the forgers a rough row to hoe. Many crankshafts, camshafts and similar parts are being shell molded rather than forged. Some shell-molded parts, in turn, are being studied for replacement by weldments. Forgers recoup somewhat through greater automotive use of forged aluminum. Processes and materials which reduce machining and lend themselves well to automated, high-volume production are moving in.

That puts the burden on the small supplier to do some volume tooling himself—on contracts that may not warrant it. In effect, the auto supplier must gamble that his know-how will keep him ahead long enough to amortize tooling. But that's an old problem.

New Worry—What some suppliers did see as a new problem was SUP. They figured that the automakers, to stabilize production and employment to reduce fund payments, would increase their trend toward integration.

Actually, says one auto firm spokesman, the sword cuts both ways. In cases where a department is hard to keep busy, work sometimes is pulled in to stabilize production. But with today's bid to expand, it's as likely the work will be farmed out and the department replaced with an expansion of other facilities in the plant.

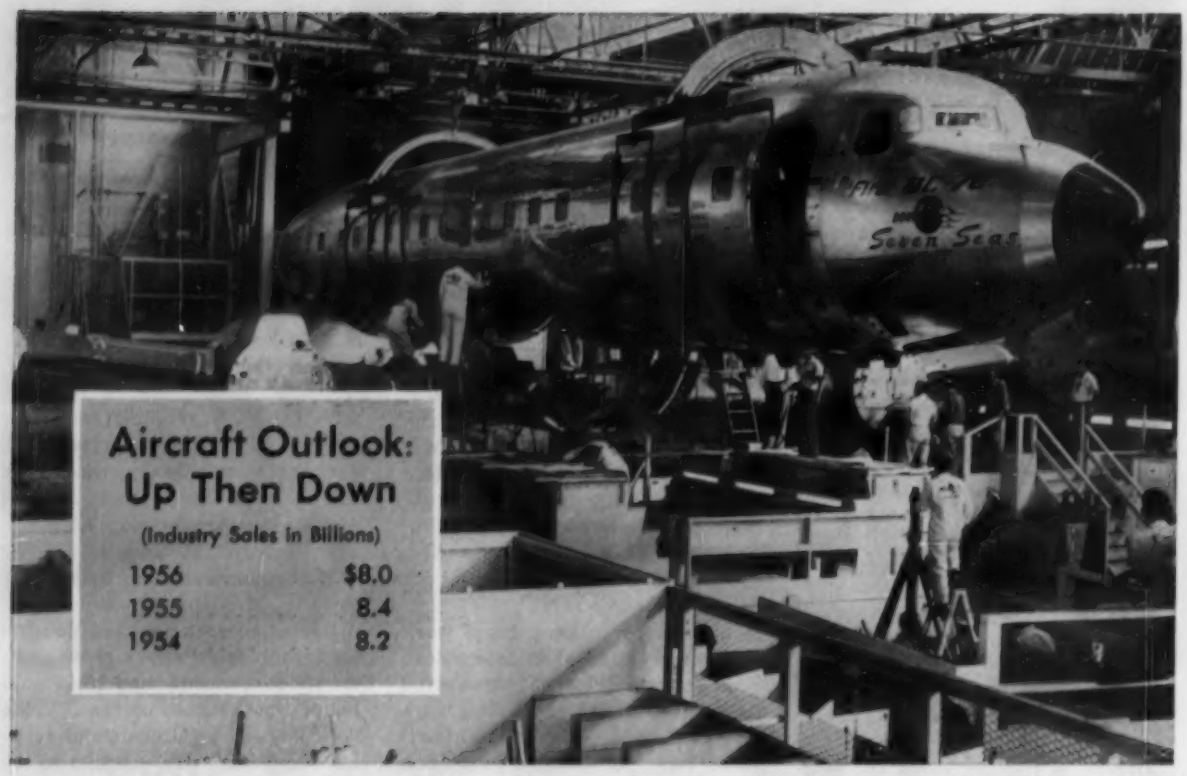
Result—These factors add up to a trend toward bigness. Also, it's becoming increasingly difficult for the job shop with multipurpose equipment to compete with the specialist that automates.

But it's just a trend; there are plenty of smaller firms with ingenuity that don't find themselves losing ground. What's more, suppliers continue to grow in number.

Co-operation — Supplier profits in most cases are increasing with those of the auto companies themselves as added volume compensates for higher tooling costs and automation. Most suppliers are working more closely than ever before with firms they supply. Automakers are helping suppliers more, recognizing them in a sense as departments of their firm as far as the cost picture is concerned.

But as competition and demand for technological savvy grow keener, so do rewards, and auto suppliers too busy to go to Florida now, stand a good chance of retiring there some day—thanks to the technological rat race.

Forging aluminum wheels for Cadillac's Eldorado at Alcoa, Cleveland



The wing and fuselage of a Douglas DC-7C are mated

Airframe Sales Fly High with Jets

TURBOPROP, turbojet and straight jets are the key to continued U. S. military superiority and faster commercial air travel.

While commercial aircraft sales are increasing, the Aircraft Industries Association (AIA) points out that Uncle Sam still consumes about 80 per cent of the airframe industry's production.

History — Last year's volume was $8.2 billion, reports the association. Some $5.2 billion was for complete aircraft and parts; $2 billion, airplane products; and $183 million, aircraft propellers and parts. Other products and services accounted for the remaining $795 million. AIA estimates that this year's totals will reach $8.4 billion and that 1956 sales will drop but still hover near the $8-billion mark. This year some 28 airframe manufacturers (including helicopter producers) are competing for military and commercial contracts.

New Developments — The first turbine airliner to get into production in this country, the Electra, is being produced by Lockheed Aircraft Corp. Eastern Airlines has ordered 40, American Airlines, 35. Eastern has an option on 30 more. Cruising speed for the plane will be 414 mph, with a top speed of 450. Eastern's board chairman, Capt. E. V. Rickenbacker, reports that the Electra is the first step toward having straight jet travel and says: "Within one year after the advent of jet-powered air travel, the airline will supersede all surface transportation as the country's prime passenger carrier.

Pan American World Airways is getting into the jet act, too. It has placed firm orders for 45 "straight" jets costing $269 million. The orders are divided between Boeing Airplane Co. (20 units) and Douglas Aircraft Co. (25 units). Both planes will fly at 550 to 600 mph. It is anticipated that the longer range Douglas jet will be used on the nonstop route between Paris and New York where heavy headwinds are often encountered. The new jet clippers will be equipped with radar and will also be fitted with reverse thrust mechanisms which will deflect the jet blast, providing a braking effect after the planes touch the runway (the reverse thrust performs the same function as reversible propellers do with piston or turboprop planes).

Others continue to concentrate on the military market. McDonnell Aircraft Corp. explains: "Our customers are the Air Force, Navy and Army. We have no civilian market and do not contemplate any activity in this field in the foreseeable future." Douglas Aircraft Co. is concentrating on both markets, although 80 per cent of its production is for the military. "Our military contracts," report company officials, "extend into

1958 and 1959 at a production level comparable to last year's." Sales outlook for commercial transports has never been better, reports Douglas (backlog of DC-6 and DC-7 type planes is 296 units). Plans for the future: Douglas will intensify its sales campaign in hopes of getting a large share of the civilian market as the jet transport era nears. It expects to be a "formidable contender" in this field.

Other Market—Competition for "jet dollars" will bring Boeing Airplane Co. back to the civilian market in a hurry. Boeing's current airplane production is almost completely for the Air Force, with B-52 heavy bombers being built in Seattle, Wash.; KC-135 and KC-97 tankers in production at Renton, Wash.; and B-47 medium bombers at Wichita, Kans. Referring to jet transportation for civilians, Boeing reports: "We are conducting an intensive sales campaign in hopes of selling jet transports to the commercial airlines." Boeing reports that the Pratt & Whitney JT-3 jet engine which powers the B-52 is performing exceedingly well on a prototype Boeing 707 jet.

"Because we are always in sharp competition with a number of companies—sometimes as many as 22 other airframe producers at one time—we note no change in the competitive atmosphere," explains Ryan Aeronautical Co. General outlook: Competition is tight, but no rougher than other years.

Future — Maj. Gen. David H. Baker, who heads up plane procurement for the Air Force, reports: Deliveries by the aircraft industry on Air Force contracts will probably amount to some $6.6 billion this year. The AF estimates that deliveries will rise slightly in 1956. General Baker also predicts that there will be a change in emphasis from airframes to electronic and guided missile equipment. "As airplane buying begins to drop in the future," he states, "the other will go up."

The situation adds up to continuing good business for the estimated 50,000 subcontractors and suppliers that support the aircraft industry. More than half of the 50,000 are in metalworking.

A section of the marine propulsion equipment is lowered into place

Alloy steel propulsion gears are of a new lightweight design

Power Package for Carrier

THE NAVY's newest aircraft carrier, *U. S. S. Saratoga,* contains propulsion equipment which will develop over 200,000 hp. This is more than any other ship afloat. It will drive the 60,000-ton carrier at a top speed of 30 knots.

Main propulsion units, consisting of four crosscompound turbines and four double reduction gears, were built by General Electric Co. Less bulky than World War II types, these turbines will burn less fuel even though greater shaft horsepower must be developed. Alloy steel propulsion gears, connecting the turbines to the ship's four propeller shafts, are 50 per cent lighter than World War II types.

Machinery space will be only 500,000 cu ft, less than 8 per cent of the ship's total cubic footage. Control of boilers, turbines, etc., will be almost completely automatic.

U. S. Airs Patent Troubles

Subcommittee testimony points up need for overhaul of patent system as backlogs build up and infringements create a judicial jam

PATENT COMMISSIONER Robert C. Watson has proposed an eight-year plan to cut the patent backlog in half.

The program would be based on increased appropriations for more examiners and a revised classification system. It should cut the backlog of 222,567 patent applications to somewhere around 100,000. Mr. Watson thinks this would be a good work load to avoid cutting personnel or spreading work too thinly. Cost: A requested appropriation of over $15 million for 1956. This year the Patent Office got along on $14 million.

Sen. Joseph C. O'Mahoney (Dem., Wyo.), strongly encouraged the proposal as it came at the end of three days of patent problem testimony before his Senate Judiciary Subcommittee.

Help Wanted — "Judging from the increasing popularity of the Patent Office," Mr. Watson said, "it probably will be receiving about 80,000 applications annually." To take care of this load, he suggests an increase in the number of examiners from 600 to 1050. Each examiner would dispose of about 95 applications a year.

Along with more employees, Mr. Watson urged improved job classifications and salary increases to get and hold personnel.

Reorganization—He pointed out that one result of having more people would be reorganization of the 307 main and 50,000 subclassifications of patent categories. This would mean less wasted time in trying to determine if an application infringes upon a patented invention.

"A moderately active (patent) group should be reclassified at least every 15 years," Mr. Watson asserted. "Active classes, such as carbon chemistry, should be almost continuously worked on."

Patent Problems—A lot of other people had something to say before the subcommittee. Their testimony pointed out that the patent office is way behind and its system outdated.

Judge Learned Hand, until recently a member of the U. S. Second Circuit Court of Appeals, told Subcommittee Chairman O'Mahoney that the patent law generally is founded on "300-year-old assumptions dating back to the time when patents were abused by Queen Elizabeth I as a means of rewarding favorites."

Judge Hand would like to see a "thorough-going examination of how the patent system works." He wonders whether patents should be restricted to relatively big innovations "which require genius" and denied to step-by-step improvements on inventions already patented.

Monopolies—Much of the "odium" and animosity surrounding the patent field rests with patent monopolies, Judge Hand declared. He defined this monopoly "as the right to prevent anyone from doing what you describe in your patent whether he needed your development or not."

Allan B. DuMont, president, DuMont Television Corp., criticized attempts to extend the monopoly period granted through a patent by: 1. Delaying the issue of an original patent. 2. Patenting an improvement on patent when it is due to expire.

Meet Paul D. Summers: Newly appointed deputy director of the International Cooperation Admistration's office of Far Eastern Operations.

Mr. Summers will assist with planning and executing activities in Japan, Korea, Formosa and other Far Eastern countries.

A former president of Mathers Fuel Corp. and more recently an executive with R-S Products Corp., a Philadelphia machinery manufacturing company, Mr. Summers has also worked for the U. S. Chamber of Commerce.

Air Force Aim: 137 Wings

The Air Force still plans to complete its 137 wings by the end of fiscal 1957, despite rising costs.

Gen. Nathan Twining, Air Force chief of staff, reports: "Our 137 wings must be good wings, not merely a force level. There can be no meat ax approach to spending."

More research and development and more bases will be needed to maintain our Air Force, Gen. Twining said, adding that it also will be important to recruit and retain more high quality people.

No Uranium Letdown Seen

It's up to the government to make sure we have a long range policy for uranium mining which will benefit industry and defense.

That's what Sen. Clinton P. Anderson (Dem., N. Mex.) believes as chairman of the Congressional Joint Atomic Energy Committee.

He points out that the AEC guaranteed purchase program for uranium ore does not end until 1962. "We will need all the uranium ore we can get if we are to meet atomic weapons goals set forth by defense planners," he says.

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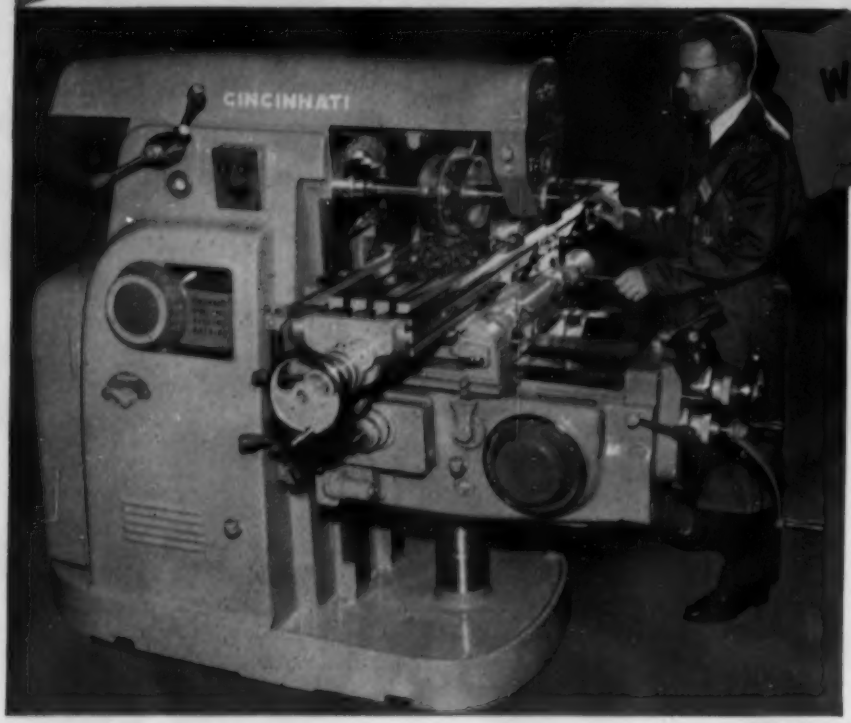
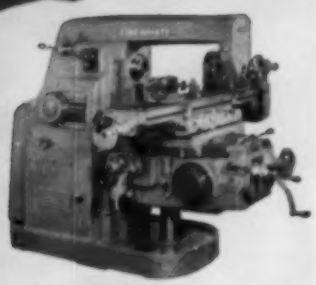


Automatic milling, using a simple one-way feed cycle on a New CINCINNATI Plain Dial Type Milling Machine with Automatic Table Cycles



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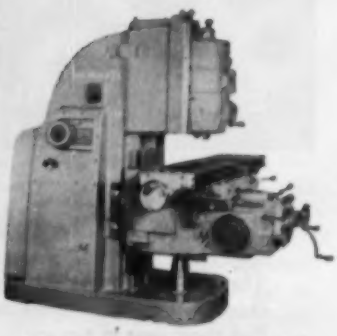

The New CINCINNATI No. 3 Vertical Dial Type Milling Machine

Ask anyone who was there. The four new CINCINNATI Dial Type Milling Machines were a big attraction at the recent Machine Tool Show. And the new Dial Types are bound to make a bigger hit in your shop . . . with the operator and foreman . . . with the methods engineer . . . with the new equipment analyst.

THE NEW DIAL TYPES are easier and safer than ever before to operate because of their dual push-button controls; complete safety from spinning hand cranks; large and conveniently located speed and feed dials.

THE NEW DIAL TYPES have the capacity to take on more work than ever before . . . higher ranges of speeds and feeds (up to 90" per minute feed rate); more than 50% increase in power; fully automatic table feed cycles if you want it; automatic backlash eliminator standard equipment.

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Everywhere you look you'll find new Dial Type features of value in your shop. There are many, many more than outlined here. You will get a better idea from the new catalog. Write for your copy of publication No. M-1915.

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Krupp's Berthold Beitz (right) personifies enlightened management in West Germany. Here he's telling Editor Irwin Such five-day workweek may not be far off

Industry men are striving for better . . .

Management in Germany

Promptly at 9 a.m. every Monday, seven men gather in a conference room in the Friedrich Krupp office building in Essen, Germany. They are Managing Director Berthold Beitz and his top executives in charge of administration, finances, operations, metallurgy, trade and exports.

Krupp Team—They make up the management team that runs the streamlined version of the famous Krupp empire, with its 40,000 employees and its world-wide business activities. At the conference, decisions may involve a new titanium plant, a steel project in India, a Canadian ore property or a new consumer product.

For decades the Krupp family ruled its empire and the destinies of its workers from Villa Hugel, a castle overlooking Essen. In 1945, Alfried Krupp von Bohlen und Halbach, present head of the house, was arrested, tried for alleged war crimes, imprisoned and his properties confiscated.

Released—In 1953, he signed an agreement with the Allies which freed him and restored his properties. Terms: He would sell his coal mines and steel plants by August, 1958.

Alfried gave the castle to the city as a museum and built a smaller house at the edge of the grounds. He also decided to hire an executive unfamiliar with Krupp associations and traditions. How he found Berthold Beitz is a story in itself. A successful insurance man in Hamburg, Beitz wanted a couple of statues for a new office building and commissioned an artist in Essen, a friend of Krupp's, to create them.

Hired—The artist brought Krupp and Beitz together, and Beitz was hired. The two often confer on many matters, but Beitz has complete power of attorney to make any decision independently.

Even with this power, Beitz believes in democratic business administration and delegation of authority, starting with his six associates and going down the line.

Better Management—Beitz personifies the growing interest in better management in a country that had no free enterprise system for 15 years. Under Hitler, management men were production managers. Employer organizations were dissolved. Except for canteens, social improvements for workers were forgotten.

A new framework for free enterprise was set up in 1948 by Finance Minister Ludwig Erhard, which was accompanied by currency reform and Marshall Plan aid. German management became interested in American management methods and is adopting them in principle. The Federal Association of German Industry has started a management school, and groups often visit the U. S. to observe.

Trade Unions—Hitler abolished German trade unions and transferred their properties to the Deutsche Arbeitsfront, or German Labor Front. After the war, the old unions were replaced by the Deutscher Gewerkschaftsbund, or German Trade Union Federation, with over 6 million members organized by branches of industry. Negotiations with industry invariably are conducted on a national basis, and there's no closed shop.

Fringes — Working conditions have improved materially, but basic wage rates are still low. Fringe benefits up to 40 per cent of the basic rate are not unusual. At August Thyssen, steelworkers average 53 cents an hour. Monthly income is $126, based on an average 51-hour week. The company pays 38 per cent for pensions, sick benefits, recreation facilities, etc. Workers pay 10 per cent.

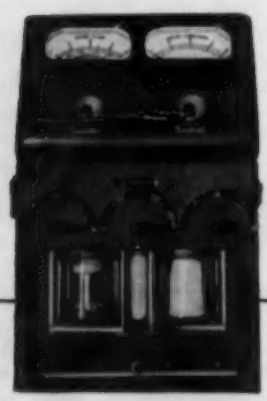
Krauss-Maffei, builder of locomotives and busses in Munich, pays skilled workers 44 cents an hour, plus a bonus of 5 to 10 per cent, which is figured weekly. Social benefits run 15 per cent. With bonuses and benefits, wage costs average 55 cents an hour. K-M also serves 2500 meals a day which cost workers 12 to 20 cents. The company subsidy is 1 to 4 cents.

Five-Day Week? — The 48-hour week is standard in Germany, but a few companies like Klockner-Humboldt-Deutz in Cologne work 45 hours in five days. Some industrialists, including Beitz, think the five-day week, with no drop in take-home pay, is not too far off.

• *This concludes a series of seven articles on West Germany by* STEEL*'s Editor Irwin Such. For copies of the articles or answers to questions on Germany, write: Editorial Service,* STEEL*, Penton Bldg., Cleveland 13, O.*

Crucible Steel, Midland, Pennsylvania

"Cities Service Heat Prover helps make special steel, saves fuel"



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Not an instrument that you buy . . . but a service we supply! . . . FREE!

Crucible Steel Company of America is another leading steel company that has found the Cities Service Heat Prover a valuable aid in its furnace operation.

Here's what Crucible has to say about the Heat Prover at its Midland Works, one of several where it is in constant use.

"The Heat Prover has become our standard tool for the setting up and checking of combustion controls on our many furnaces at Midland. It has also helped immensely in setting up special atmospheres for special grades of steel by providing fast and reliable analyses, and has been particularly instrumental in the improvement of fuel economy. Cities Service has kept the Heat Provers in perfect running order and on many occasions has gone out of its way to help us."

You, like Crucible Steel, can achieve better results in *your* furnace operation with the Cities Service Heat Prover. Supplied and maintained free by Cities Service, it offers easy portability, rapid continuous sampling, simultaneous reading of oxygen and combustibles. For more information, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

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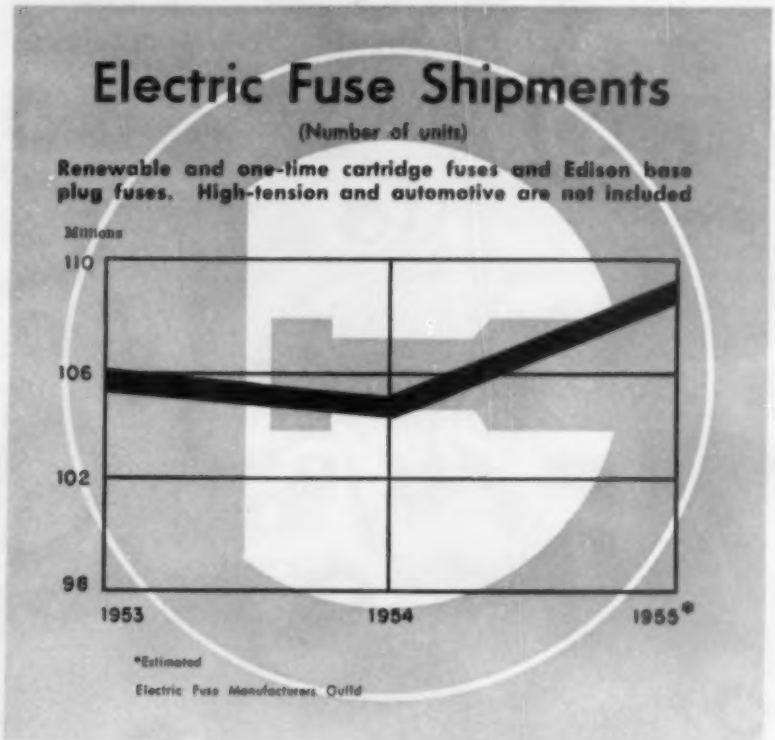


As electricity output rises and metal supply eases . . .

Fusemakers Eye New Records

FUSEMAKERS are keeping one eye on electrical energy consumption figures and the other on the copper situation as they gear their machines for record production this year. What they see makes a pretty picture.

Shipments this year will surpass 1953 and 1954's (see chart). By adding high-tension and automotive fuses, total shipments for 1955 will jump to about 128 million units, good for $32.5 million in sales receipts. With electric power output still increasing, the peak for the fuse industry is still in the future. J. S. Messer, president of Economy Fuse & Mfg. Co., Chicago, says that barring any serious materials shortages, unit sales in 1956 should be at least as good as 1955's, probably 5 per cent better.

Cereal and Fuses—Much of this increase will come in household fuses. While they account for the bulk of unit sales, they are poor profit items for manufacturers. Being a grocery-store item, you can't charge more than the housewife is willing to pay. In some cases, they are sold at below production costs.

Even so, this is a market the fusemakers can't overlook. The housing boom and the campaign for more adequate wiring in homes (STEEL, Aug. 1, p. 36) have increased use. "In the old days, you had maybe four or six 20-ampere, 110-volt circuits in a house," says H. v. P. Thomas, advertising manager, Bussman Mfg. Co., St. Louis. "Now you have 8 to 12, some of which are 30 amp, 220 volts. This means not only more but also heavier fuses." It also means a heavier replacement market — most industry officials estimate it at about 1½ or 2 a year per home.

Old Stand-Bys—Industrial fuses — the cartridge types—are the bread and butter lines. Price is not the prime consideration. The tremendous increase in the use of electricity by industry means not only increased sales but also better profits for the industry. The Edison Electric Institute reports that the sale of electric power to ultimate consumers in the first half of 1955 ran more than 15 per cent ahead of the same 1954 period. Most of that increase has come in industrial applications. This trend is expected to continue indefinitely. That's the big reason for optimism in the fuse industry.

Not all is peaches and cream. The metal shortage has short-circuited industry's efforts to increase its shipments. The list of metals used reads like a purchasing agent's nightmare: Copper, brass, nickel, zinc, steel and silver. None of these is overabundant. Lesser used metals are cadmium, antimony and bismuth.

No Substitutes — Copper has been the big holdback. There are certain jobs that only copper can do. Fusemakers have tried to substitute aluminum for plug bases and other parts, but they claim the switch isn't practical.

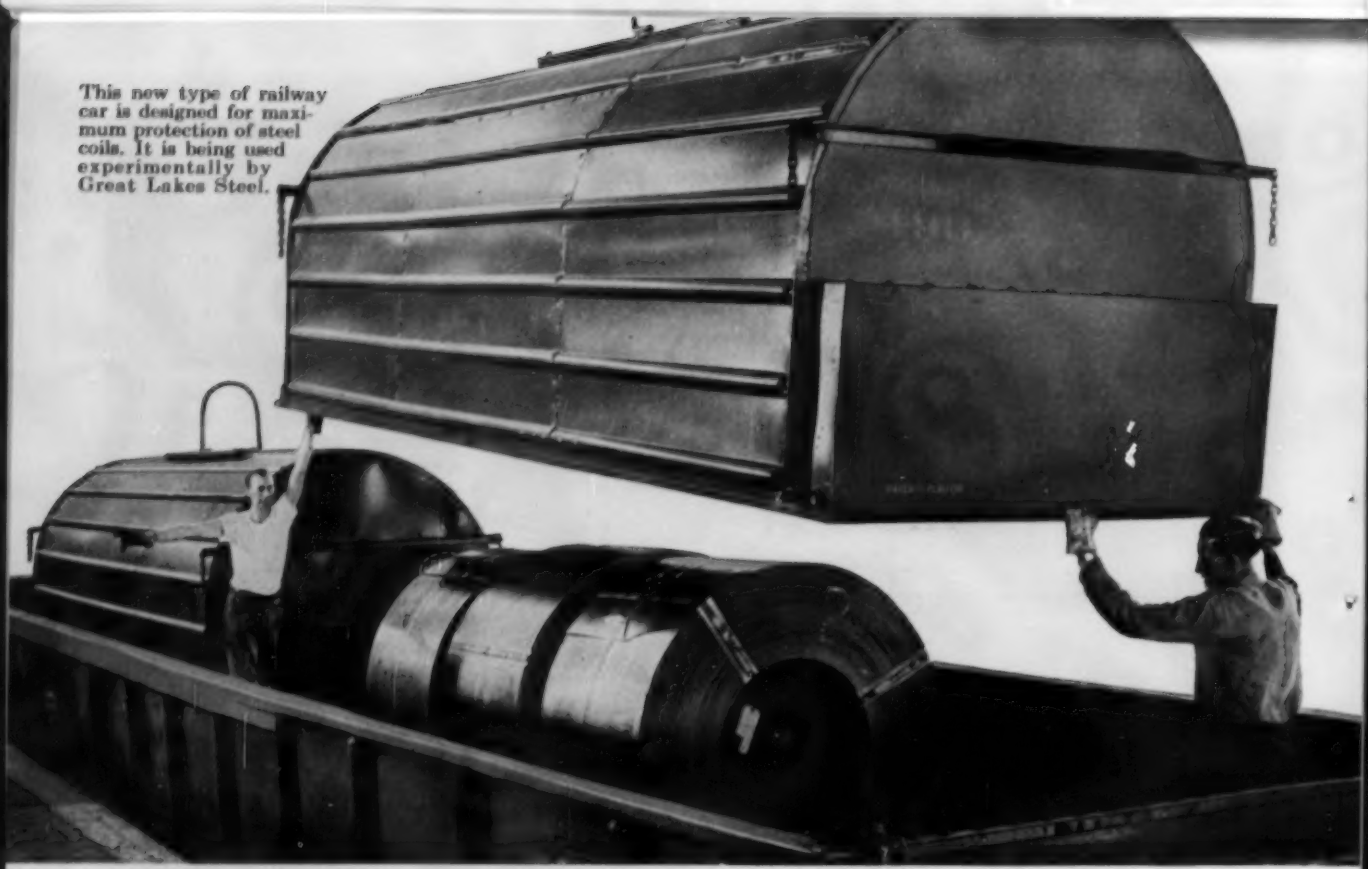
Few fuse manufacturers have had to shut down because of the metals shortages. They point out that they are small tonnage customers for the brass mills, and their inventories were built high enough to see them through without more than an occasional slowdown. They are confident that they can run on full power now that copper supply is showing signs of recovery and the government has released additional nickel from the stockpile.

ODM To Divert More Nickel

More nickel shipments scheduled for the defense stockpile will be diverted to civilian markets.

The release of 5 million lb during November and December is expected to be announced soon by the Office of Defense Mobilization.

ODM Director Arthur S. Flemming has been short-cutting part of the stockpile take to meet civilian shortages since last March. Congress suggested that defense backlogs be met with civilian surplus. So far there hasn't been any civilian surplus and there probably won't be for some time.

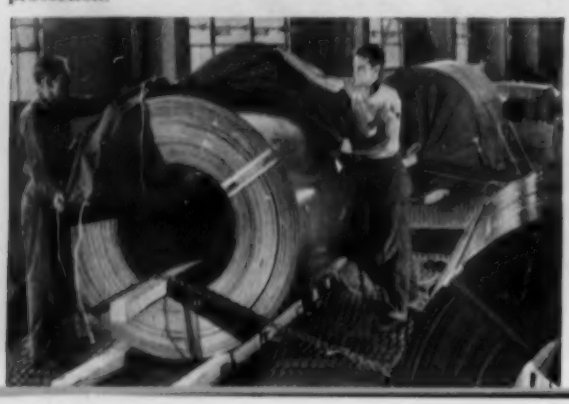


This new type of railway car is designed for maximum protection of steel coils. It is being used experimentally by Great Lakes Steel.

How Great Lakes Steel *delivers* quality

Another order receives individual attention as sheets of steel are wrapped with a waterproof covering and banded to meet the customer's specifications.

Steel coils (below) are securely blocked on a truck and trailer at Great Lakes Steel. Heavy tarpaulin cover is provided by truckers as standard equipment for additional protection.



The emphasis on quality at every stage of production at Great Lakes Steel extends right on through to the Delivery Department. There, careful attention is given to handling and packaging each coil and bundle to make sure that the customer receives his order in prime condition.

The Delivery Department has another important responsibility, too. It must see that our products reach each customer in ample time to meet his production schedules.

For quality with service—that extends all the way from the beginning of our operations to the end of yours—call on Great Lakes for your flat-rolled steel requirements.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

By FLOYD G. LAWRENCE *Detroit Editor*

MIRRORS OF MOTORDOM

Putting "carriage-trade" elegance into the new Continental

Craftsmanship on the Line

NATIVES will tell you Owosso, Mich., is the town where Thomas E. Dewey first saw light of day. It has since assumed the same relationship to the Continental Mark II.

The residents of this quiet Michigan community might well be surprised by this turn of events. Up until last December, the plant now making Continental Mark II bodies was a sawmill turning out wooden window and door frames. It's operated by Mitchell-Bentley Corp.

Precedent — One of the attractions for tourists who find their way to Owosso is another Mitchell-Bentley plant. Its Ionia Mfg. Division, less than a day's tractor ride away, is already well known to readers of this column as a builder of station wagon bodies. What's more, Ionia dabbled in Packard Caribbean bodies once upon a time.

So it's hardly surprising that Mitchell-Bentley entered the Continental picture on May 29, 1953, when officials of the firm were invited to discuss bidding on the contract for building the new body. Revamping the section of the Owosso plant for the job took about four months, beginning the first of this year. Limited production began in April, and the first body was delivered to the Continental plant near Detroit June 15.

First Steps — Using stampings supplied by vendors, work begins in a room where subassemblies like frame rails, inner and outer header bars and about 25 other brackets and components are built up. These are gun welded on special fixtures and stockpiled for use in assembly.

The real start of car assembly is the floor pan. It's built up in two halves, front and rear. About two dozen major parts and brackets go into this assembly. After the two halves are completed, they are joined in a third fixture. Meanwhile, right and left side sections are being framed in horizontal stationary fixtures, including such parts as rear quarter panel, rocker panel, cowl support member, roof side rail, etc.

Welding—The next step in assembly, and it's about half an hour from one station to the next at the 14 to 15 unit-per-day production rate, is a move to the main body-framing fixture. In this fixture, the floor pan and side assemblies are clamped into position to be joined by the remaining major body components, such as cowl, dash panel, roof panel and rear deck members, except the lid. All these components are spotted with welding guns, and the body moves out on its dolly onto the "line."

The first major step is to com-

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plete the 4200 arc and gas welds, including use of a seam welder on the joint of the roof panel and roof rail. At the end of this process stands an inspector who spends his time trying to tear apart the welds that have been made—insuring excellent rigidity in the completed bodies.

With Care—Welds which are just so-so, and there aren't many, are re-done, and the body then receives a rough-leading treatment which fills in the major seams at roof panel, rear deck, rocker panel and similar points. Seams are knocked down in a grinding booth; the rear deck is added; and the body, rather than being ready for shipment, is ready for finishing to be started.

Based on the number of bodies on the line and the production rate, each Continental body spends about a day and a half from this point until it is ready for shipment. Less time is required for complete assembly of most cars produced in high volume.

Wrapping Up—As a final check, toward the end of the line the body is covered with oil to highlight any possible imperfections that may have been impossible to feel. They are corrected, and a final check is given to the fit of doors and deck lids, which must fit within 0.030 in. The Continental inspector then gives the body the final once over; if everything is up to snuff, he tags it with a seal clearing it for shipment in white to the Continental plant.

This is an all-new facility with 189,000 sq ft of manufacturing space. It has a chassis and final line capacity of only seven units each, giving the Continental Mark II the deserved title of "only custom-made automobile built on a production line." The manufacturing philosophy is summed up by the statement of Charles P. Devoss, divisional manufacturing manager: "Where handwork yields better quality, we do the job by hand."

Piuperfect—The bodies in white from Owosso are fitted with the front end sheet metal in the start of operations and then disassembled. They're painted simultaneously in a 14-stage operation, which includes hand sanding and baking between applications of a primer coat, a double surfacer coat and two separate double coats of lacquer. All parts must match perfectly, and thickness of the paint on each unit is checked. Oil sanding, buffing and rubbing by hand are repeated over and over until the casual visitor begins to wonder if one group isn't bent on removing the paint that others are putting on.

Finally, after three trips through the bake ovens, the body is carefully inspected and started through the trim line. Garnish moldings, mirrors, hand brake lever, visors, dome lights, coat hangers, inside door hardware, instrument harness assembly, map light, radio, speedometer and tachometer cables and glove compartment are installed in just three assembly stations. What's more, all electrical connections are made and the interior and exterior of the body are cleaned and inspected in that same distance.

Underpinnings — Meanwhile, chassis buildup begins on a cross-feeding assembly line. Rear axle, springs, shock absorbers, tail pipes and mufflers, brake and fuel lines, front suspension, brake drums and steering linkage are assembled on the line — only about 50 ft long. In addition, the differential and grease fittings are filled with lubricant, and the brakes are filled and bled. The chassis is painted on arriving at the final assembly line.

Next come the engines. Before delivery to the assembly plant, they have been given a hot test, partially disassembled, inspected, re-assembled and re-tested. Each automatic transmission, before shipment to the plant, also has been road tested in a vehicle. Now the engine is assembled with its transmission and tested on a dynamometer for about ½-hour at various speeds and loads. Tappets are adjusted before the engine is installed.

Hidden Quality—All that has taken about ten days, to give an idea of the thoroughness of each operation. But that doesn't tell the whole story. Chrome finish is subjected to antirust tests three times more severe than SAE standards require; bodies are undercoated before assembly to insure over-all protection; nuts and bolts are tightened by hand to insure proper torquing, as in aircraft assembly.

Interesting, too, are mechanical features like the frame, which is described as the "ladder" type. Side rails are spaced far enough apart for the body to be recessed between them, giving an over-all car height of only 56 in., without any sacrifice in headroom. Also unique are thermostatically controlled shock absorbers which control valving as road conditions require for the proper ride-handling compromise.

Performance—The result: A car which is flawlessly finished, carries out well its intended "modern formal" motif and offers a superb ride. The ride is achieved, not only through the shock-absorber action already mentioned but also because this car weighs over 5000 lb, with an awesome sprung to unsprung weight ratio. Performance is not remarkable, with 0-60 mph in about 13 seconds, but certainly meets the engineers' intent of "adequate." Horsepower, incidentally, is not planned for announcement.

To sum it up: The Continental Mark II is a bit of elegance in "stamp 'em out and sell 'em" Detroit. It's as unusual as it is refreshing.

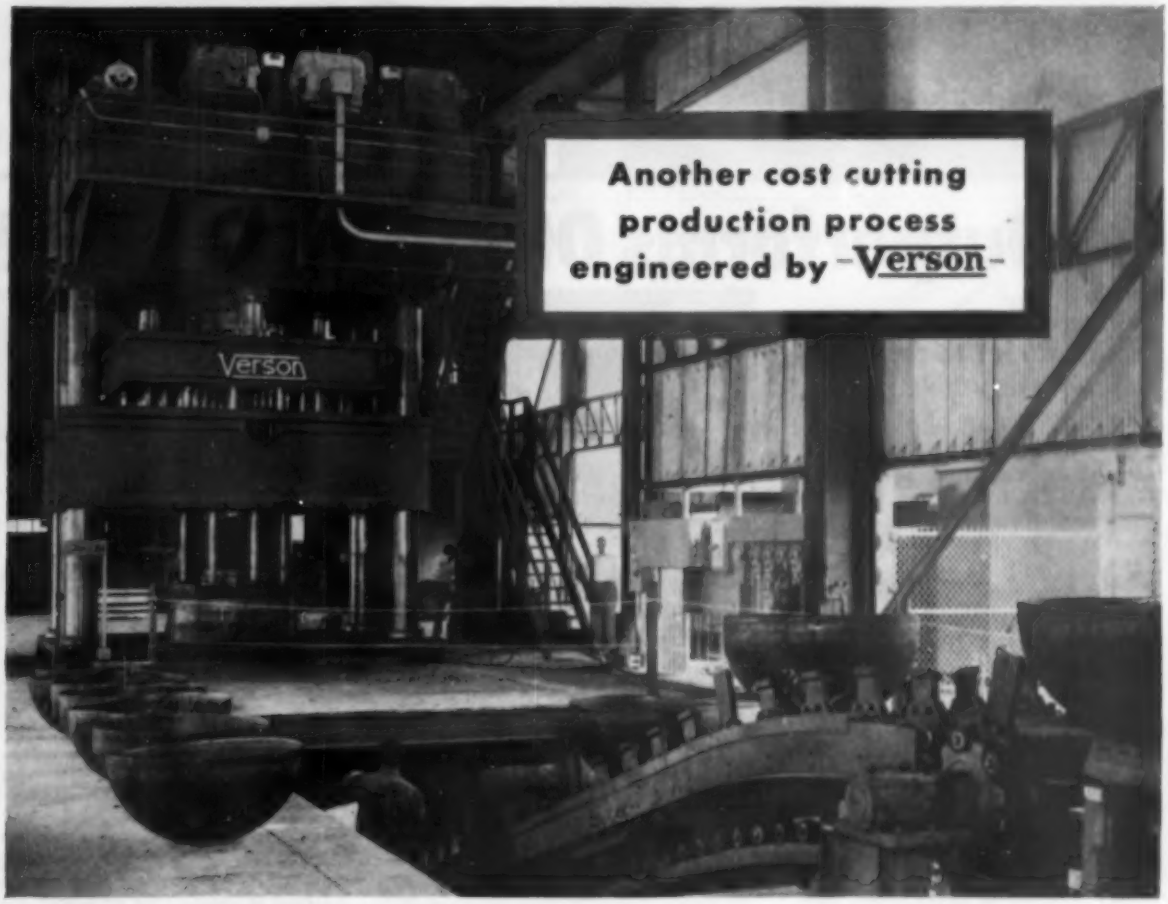
Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994	676,269
May	913,257	621,318
June	825,031	635,540
July	815,324	543,344
August	736,039	523,799
September	567,717†	364,156
October	.....	312,078
November	.....	616,395
December	.....	761,954
Total	.....	6,896,678

Week Ended	1955	1954
Sept. 17	146,484	74,026
Sept. 24	151,804	72,804
Oct. 1	144,534	84,110
Oct. 8	102,079	81,610
Oct. 15	130,908†	59,511
Oct. 22	140,000*	62,376

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*



Hot and Cold forming large diameter tank heads

In a unique process developed by Verson, this 3000 ton double platen, double action hydraulic press forms heads for pressure vessels in a single stroke. The heads are hemispherical and elliptical ranging from 40 inches to 10 feet in diameter and up to 3 feet deep.

Plate is fed to the press automatically. The head, regardless of size, is formed in a single press stroke. The completed head is pushed through a bed opening to a pneumatically operated elevator. The work is then transferred from the elevator to a conveyor and discharged. Tooling is supported in a manner that not only permits forming the wide range of sizes, but allows each size to be pushed through the bed opening.

Here is a good example of Verson's basic philosophy—*Anyone can build a press, Verson builds production processes.* If you have a problem involving the press forming of metals, this philosophy will pay you dividends. For recommendations, send an outline of your requirements.

Customized

INSTALLMENT AND LEASING PROGRAMS

For manufacturers who wish to pay for modernization out of the savings that Verson high-efficiency presses can effect, Verson offers installment and leasing programs tailored to your needs. For full details, send an outline of your requirements.

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carbide NEWS

26 Outperforms Other Carbides 8:1

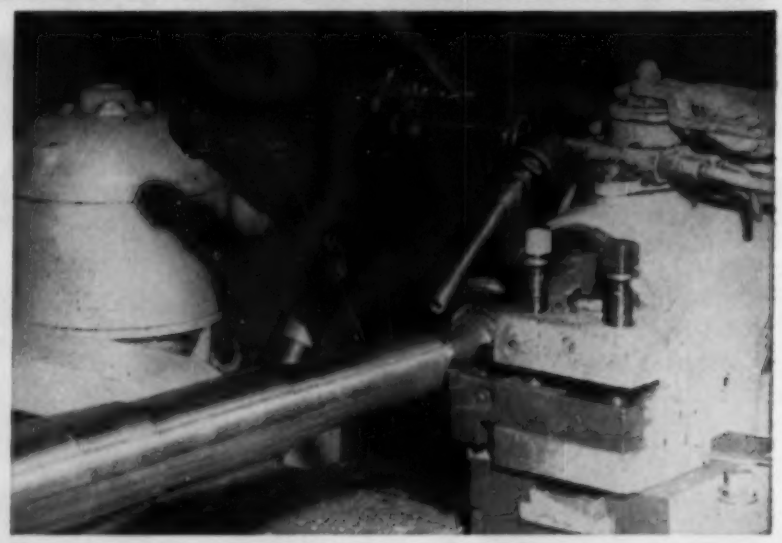
Boosts sprocket shaft output from 15 to 120 pieces per grind

In a series of production comparison tests, Grade 26 again came out on top—this time in machining forged steel (Rockwell 44) tractor sprocket shafts at a large midwestern tractor company.

With Wessonmetal 26, output averaged 120 pieces per grind as compared with 15 pieces per grind for all other steel cutting grades tested.

The operation is performed on a new 20" Monarch Air Gage Tracer lathe and consists of finish turning the shaft diameter, forming radii and chamfers, and rough turning all other diameters. Length of travel in the cut is 18¼"; speed 375 sfpm; feed range from .009 to .012". Average depth of cut for all diameters is ¼-inch.

Primary reason for the big increase in life achieved with Wessonmetal 26 is its ability to stand up under widely varying conditions. Inserts made of other carbides shattered or broke after 12 to 15 pieces on one cutting edge and could not be indexed. This trouble was eliminated with Grade 26, which averaged 20 pieces per edge and could be indexed to give a total of 120 pieces per grind.



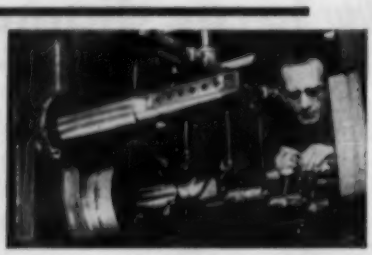
Worthy of note also is that the performance of Wessonmetal 26 (a "nearly universal" steel cutting grade) was achieved in comparison even with carbides of a specialized nature specifically selected for this operation.

New Film Points Way To Better Tooling

One of the most dramatic technical sound films yet produced is now released by the Wesson Company for showings to technical and shop groups.

Built around the development of tooling for an actual job—the machining of tractor track links—the 16 mm. technicolor sound film—which took two years to complete—records the *failures* as well as the successes achieved. The trials and tribulations encountered will remind many of their own experiences.

Entitled "Tools of Abundance," the film tells how a large manufacturing committee working with Wesson tool engineers carried a specific job through to completion. It is the story of how cooperation helps to develop and improve American manufacturing methods.



This story of teamwork—supplemented by about a dozen other general machining and high production operations in the film—provides a rational approach to solving other difficult tooling problems. For a showing to YOUR company, write for the film on your company letterhead. A Wesson man will bring it to you.

tools Wesson carbide Wessonmetal

WESSON COMPANY
DEPT. AD
1220 Woodward Heights Blvd.
Detroit 20, Michigan

Tool Hints

If you have an idea that you would like to get better tool life on a job than you are getting, do these things and you may find you were right:

1. Check for vibration and chatter and eliminate all you can. Both are deadly to tool life.

2. Check whether the rake angles are correctly ground. There is a best combination for any job.

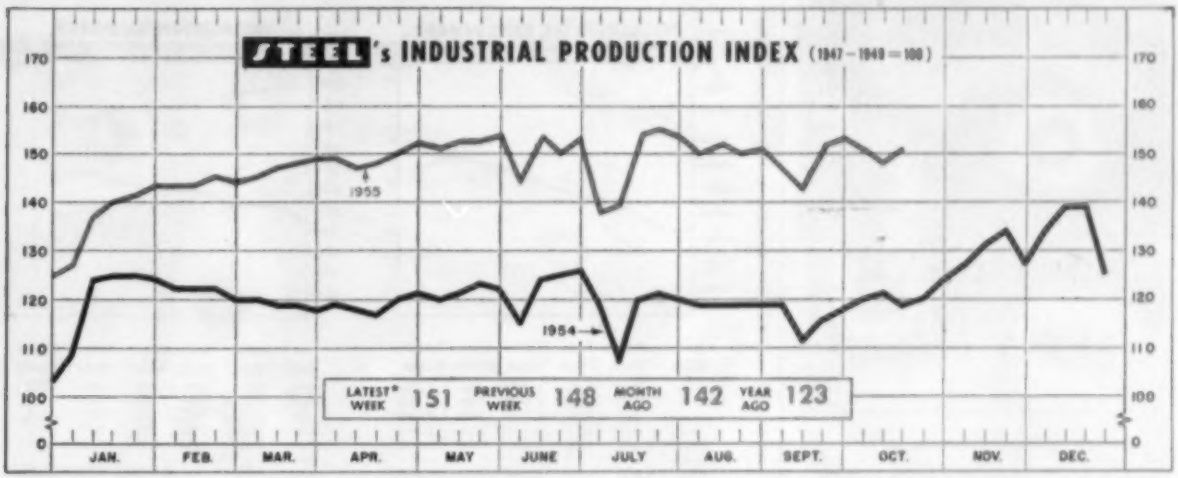
3. Check whether you have the ideal combination of speed and feed.

4. Check whether tools are changed before they get too dull. Dull tools wear faster than sharp ones. Keeping them at work is false economy.

5. Check tool after each sharpening against the tool PRINT. This is excellent insurance.

None of these suggestions are new. But they are still keys to better tool performance.

(P.S.—A sixth method is to call in a Wesson man)



*Week ended Oct. 15. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Light Is Still Green for Automakers

OPERATION REPEAT is swinging into action in the auto industry—a repeat of the booming production and sales records marked up in 1955.

Industry spokesmen talk of another 8-million passenger car year in 1956, see a 7-million-car-a-year plateau beyond that. (Quite different from a year ago when such highly regarded prognosticators as Harlow H. Curtice of General Motors wouldn't venture guesses over the 6-million mark for 1955.)

Battle Cry—Detroit has taken to heart the slogan, "nothing breeds success like success." Virtually every major producer expects his 1956 year to be even bigger than banner 1955. Some hope to double output—American Motors Corp.'s Rambler for one.

In the sales race, Buick intends to hang on to third spot wrested from Plymouth a couple of years ago. So 1 million Buicks are programmed for 1956, compared with a little over 800,000 this year.

Plymouth still has its sights set on getting back in the number three slot. It plans almost 900,000 units in 1956, compared with less than 800,000 this year.

Sales Zip — Then there's the Chevvy-Ford battle for first place. Ford got the jump on 1956 model introduction and claims sales of well over 100,000 cars and trucks in the three weeks or so. "Sales during the introduction period are even higher than for the same period following introduction of the 1955 models," says R. S. McNamara, Ford vice president and general manager of Ford division. (Not bad for a face lift.)

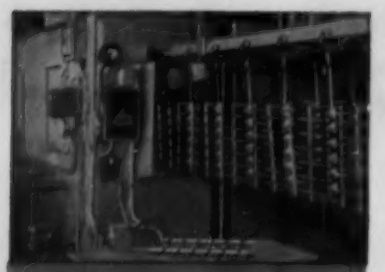
Apparently, the company's safety plugs have been paying off. Mr. McNamara adds: "Customer demand for the option items (safety belts, padded instrument panel and visors) has been far greater than the division's highest expectations and temporarily exceeds the supply." Production has been upped.

Time's Awasting — Chevvy is just getting back into production

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,320[1]	2,330	1,769
Electric Power Distributed (million kw-hr)	10,650[1]	10,639	9,193
Bitum. Coal Output (1000 tons)	9,800	9,580	8,417
Petroleum Production (daily avg—1000 bbl)	6,680[1]	6,690	6,152
Construction Volume (*ENR*—millions)	$346	$465	$259
Automobile, Truck Output (*Ward's*—units)	130,908[1]	102,079	59,511
TRADE			
Freight Car Loadings (1000 cars)	812[1]	807	703
Business Failures (Dun & Bradstreet, no.)	200[1]	207	230
Currency in Circulation (millions)[3]	$30,552	$30,428	$30,159
Dept. Store Sales (changes from year ago)[3]	+6%	+15%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,642	$22,196	$16,421
Federal Gross Debt (billions)	$280,315	$277,503	$278,844
Bond Volume, NYSE (millions)	$24,861	$20,954	$14,869
Stocks Sales, NYSE (thousands of shares)	12,213	10,513	10,587
Loans and Investments (billions)[4]	$84,637	$84,493	$84,569
U. S. Govt. Obligations Held (billions)[4]	$30,291	$30,347	$37,614
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	264.1	264.0	218.9
All Commodities[7]	111.2	111.4	109.8
Commodities Other than Farm & Foods[7]	118.7	118.6	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100



Cincinnati
Owners Report

- "processes 8 tons of parts daily"
- "120% more production"
- "tremendous time and labor saver . . . time saved, 75% labor saved, 81%"
- "cleans and finishes 1000 parts per hour in 16' x 40' floor space"

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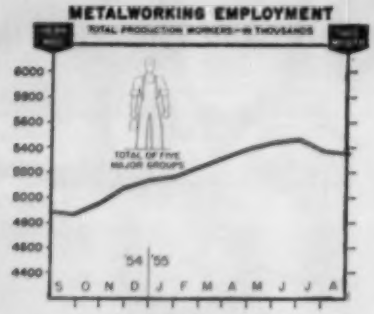
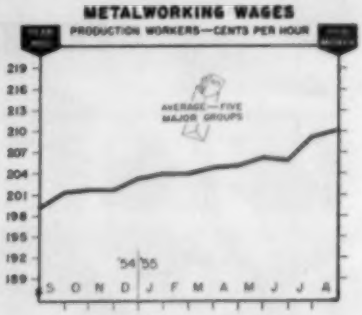
THE BUSINESS TREND



1954	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Aug.	967	820	1,095	766	1,238
Sept.	965	821	1,097	785	1,183
Oct.	989	829	1,093	800	1,249
Nov.	988	844	1,092	811	1,334
Dec.	1,002	843	1,106	809	1,375
1955					
Jan.	1,013	834	1,109	800	1,400
Feb.	1,032	844	1,125	803	1,426
Mar.	1,057	860	1,144	803	1,447
Apr.	1,076	868	1,164	804	1,462
May	1,096	877	1,174	809	1,456
June	1,115	884	1,182	816	1,447
July*	1,102	865	1,164	807	1,425
Aug.*	1,112	881	1,155	824	1,376

*Preliminary
U. S. Bureau of Labor Statistics
Charts copyrighted, 1955, STEEL



1954	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Aug.	210	190	201	181	213
Sept.	214	191	203	182	216
Oct.	213	192	203	184	216
Nov.	214	193	203	184	218
Dec.	214	194	204	184	219
1955					
Jan.	216	195	203	185	220
Feb.	215	195	204	185	220
Mar.	216	195	205	185	221
Apr.	217	195	206	186	220
May	218	196	207	187	222
June	221	196	208	186	218
July*	227	199	208	187	224
Aug.*	229	199	209	187	226

*Preliminary
U. S. Bureau of Labor Statistics

after change-over, so it will be a while before there are any comparable sales figures. Nov. 4 is Debut Day.

Ford has been breathing down Chevvy's neck for the last several years; this may be the one for them to go by. It will be interesting to watch.

Dealers Clean Up . . .

Chrysler Corp. is making another bid for its "traditional" 20 per cent of the market. Fourth quarter building is programmed for 400,000—almost as many as it built in the first nine months of 1954. If there are no slips, the corporation should hit its target, for schedules of all makers call for 2 million cars to be built in that period.

What about dealers? "Orderly cleanups of '55 models are virtually assured," says *Ward's Automotive Reports.* A big help was September sales, 15.3 per cent higher than expected. Bustling sales chopped inventories to 445,000 units — lowest since December, 1954, and 37 per cent lower than the July high of 707,400. It's a feat even the Monday morning quarterbacks can view with respect.

How About Consumer Credit? . . .

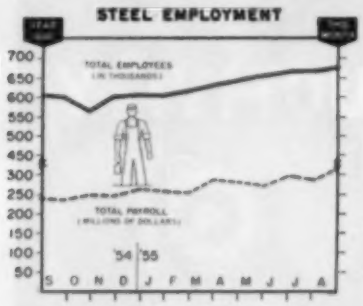
Tied in closely with auto sales is installment buying. There are many questions about consumers being overextended.

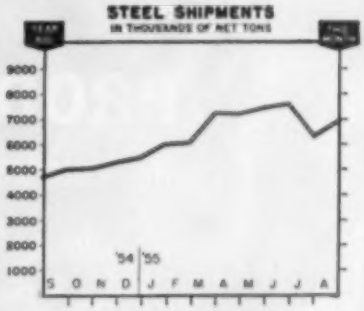
The Cleveland Trust Co. says: "For most families the present debt does not appear to be out of line with current income . . ." Compared with earlier years, today's installment debt looks huge. For example, it's five times what it was in 1940. But almost all business indicators expressed in dollars are far above what they were even as recently as ten years ago because of the expansion of our economy and inflation.

A better yardstick is the ratio of debt to income. At the end of 1929, it was 3.8 per cent; in mid-1941, 7.0 per cent, the prewar high; last August, 9.5.

More To Buy . . .

Reasons for the jump: More kinds of goods are bought on the installment plan. Our standard of living has created greater demand for those goods, so they account for more consumer spending than before. Also, people who once looked suspiciously at installment plans now buy "on time."





	Employment in Thousands		Payroll in Millions	
	1955	1954	1955	1954
Jan.	605	645	$258.8	$251.3
Feb.	616	636	255.1	236.6
Mar.	630	621	288.2	249.7
Apr.	643	609	282.0	232.6
May	654	606	249.1	234.4
June	667	606	298.4	236.4
July	676	603	296.8	232.8
Aug.	680	601	320.7	236.8
Sept.	...	597	....	234.6
Oct.	...	596	....	244.7
Nov.	...	599	....	247.7
Dec.	...	605	....	262.2

American Iron & Steel Institute

Net Tons

	1955	1954	1953
Jan.	6,009,958	5,727,600	7,067,636
Feb.	6,119,900	5,364,978	6,533,227
Mar.	7,268,795	5,583,690	7,436,919
Apr.	7,279,321	5,287,972	7,162,460
May	7,540,889	5,423,168	7,209,396
June	7,770,213	5,887,488	6,950,059
July	6,250,597	4,490,179	6,582,513
Aug.	7,053,615	4,681,242	6,498,605
Sept.	.....	5,004,222	6,400,757
Oct.	.....	5,035,364	6,726,850
Nov.	.....	5,240,209	5,903,980
Dec.	.....	5,448,649	5,684,920

American Iron & Steel Institute

Another bright spot: A Federal Reserve System survey showed more than half the nation's families had no installment debt in early 1955.

The dangers of too much credit: People are tempted to go in over their heads. Loose credit tends to be inflationary. The government's recent tightening of credit should work against those possibilities.

Abuilding We Will Go . . .

Heavy construction continues to chop up the record books. Newest candidate: October, according to *Engineering News-Record*. The latest week's contract awards pushed the total for the year to a record $14,945 million for the first 41 weeks of the year. That's 32 per cent ahead of last year and 16 per cent higher than the old mark hit in 1952.

Private mass housing projects and industrial building continue among the pacemakers. Private construction accounts for the bulk of contracts (about three-fifths of the total to date). It's up 46 per cent from 1954.

One phase of construction is off the record-blazing trail, temporarily at least. Housing starts in September hit their lowest ebb since February, bringing up the question: Did the government goof when it tightened credit?

It's still pretty early to tell. Starts of 113,000 in September were an 8-per-cent skid from August, but the usual seasonal pattern is for a dip. It was only the second time this year that starts failed to reach their year-ago level. When you figure that September, 1954, was the second best September on record and increased against the seasonal trend, it really shouldn't be too much of a surprise that starts are down a little this year.

Industrial Output Climbs . . .

More records, this time in industrial production. The Federal Reserve Board's seasonally adjusted index put output at 141 per cent of the 1947-1949 average. Some forecasters say the index will hit 145 before the year is out.

Helping push the new record were primary metals, picking up after the usual hot weather slip. Durables generally were up. Nondurable goods plugged along at 125, about the same level as earlier this year (and up about 10 points over a year ago).

• Edited by GEORGE BLACK

PRODUCTION INCREASED

Installation of a new Goss & Deleeuw Chucking machine at our Stainless Engineering and Machine Works Division, will speed delivery of valves and fittings. The Goss machine has seven rotating spindles, four of which are used for holding end working cutting tools and three for threading applications. A 34% reduction in the machining time of stainless steel 90° ells and tees has already been demonstrated.

PUMPING CUTTING FLUIDS

A new bulletin describing the handling of cutting fluids used for machining stainless steel has been announced by Vanton Pump & Equipment Corp. Reprinted from an article appearing in Machinery Magazine, the bulletin gives full technical data and description of the pumping problem and its solution. The pump involved has a Bakelite body block and Hycar flexible liner. Ask for Bulletin VP17.

CASTING PUMP PARTS

The story behind the redesign and unique foundry techniques involved in substituting stainless steel end plates for aluminum, cutting the weight of the stainless housing and reducing machining time from 14 hours to 2 is told in Advanced Know-How # 2. This second in the series of case histories being prepared by our Foundry Products Division, shows how the use of the shellcast® and shellcores made possible a better product (the Vanton pump) for less money. Ask for AKH #2.

CHEMICAL SHOW—PHILADELPHIA

Three hundred and sixty square feet of exhibit space referred to as Booth 602 will be devoted to telling how Advanced Know-How makes the difference in corrosion resistant Castings, Valves, Fittings and Pumps. There will be plenty of products on display, plus working and cut-a-way models. Our key people will be on hand to greet you and assist in any way possible. We hope you'll stop by.

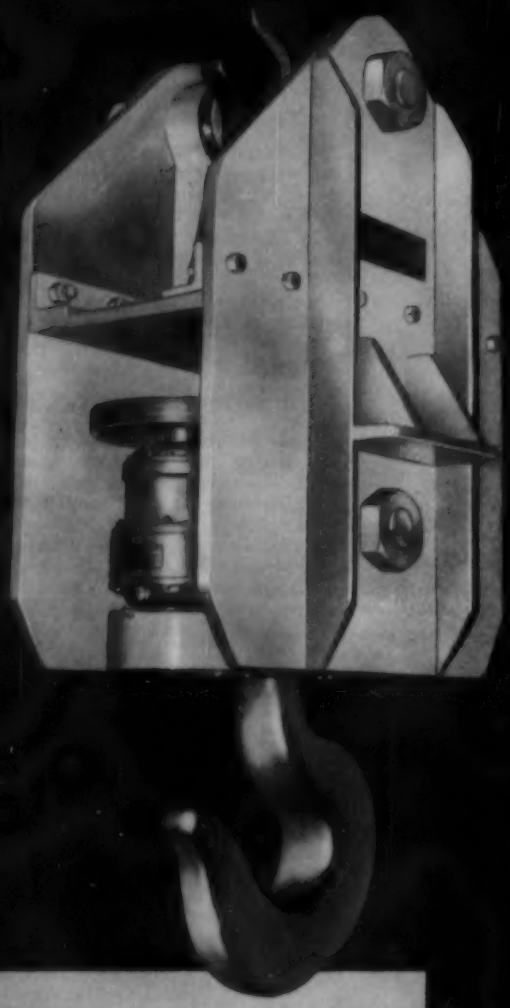
COOPER ALLOY
CORPORATION • HILLSIDE, N.J.

another step in . . .

PRODUCTIVITY

the Motorized Rotating Crane Hook

by HEPPENSTALL



. . . Here is the latest development in the Heppenstall line of Tongs. It is the new motorized rotating crane hook designed by Heppenstall Engineers for use with existing crane blocks and hooks.

Features of this new Crane Hook are:

1. Turns all sorts of loads such as: coils, sheets, rolls.
2. Hook rotates a full 360 degrees in either direction.
3. All operations of the Heppenstall Motorized Rotating Crane Hook are controlled by the craneman from his cab.
4. A load-cell can be incorporated with the hook recording weight of each load as it is lifted.
5. Capacities for largest industrial cranes.

Used with a "C" hook, the Heppenstall Motorized Rotating Crane Hook permits a coil of steel to be turned horizontally as it is lifted.

Electric motor furnishes power for turning the hook. Motor can be supplied to meet your current characteristics.

HEPPENSTALL

. . . tongs for every lifting problem.

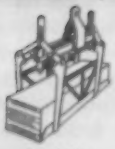
Write for complete information. Heppenstall Engineers will be pleased to help you adapt this new Heppenstall Motorized Rotating Crane Hook to your production requirements.

Send for this new catalog. It provides you with the solution to many lifting problems. Address: Heppenstall Company, Pittsburgh 1, Pa.

Tongs to lift Coil Horizontal around O.D.

Horizontal Coil Tong over ends

Tongs for lifting groups of rounds



Sheet lifter

A. D. SCHULTZ
. . . chief engineer at Eaton stamping div.

HAROLD E. WHITELEY
. . . Geuder, Paeschke & Frey mfg. manager

ROY H. KALLAS
. . . Grieve-Hendry general manager

A. D. Schultz, product engineer, was promoted to chief engineer of **Eaton Mfg. Co.'s** stamping division, Cleveland.

J. W. Elliott, works manager, **Brubaker Tool Corp.,** Millersburg, Pa., was elected vice president of the corporation. He continues as general manager of Morton Machine Works, a subsidiary housed in the Brubaker plant.

Charles A. Barnett was made vice president-engineering and sales at **Fletcher Aircraft Corp.,** Pasadena, Calif.

William R. Heath, vice president-manufacturing, was elected executive vice president of **Buffalo Forge Co.,** Buffalo. **George P. Schivley** was made director of manufacturing.

Forwood C. Wiser was elected vice president, **Pittsburgh Standard Conduit Co.,** assuming responsibility for sales and production at the new Morrisville, Pa., plant.

Henry Davis was appointed Twin Cities director of sales and purchasing for **American Iron & Supply Co.,** Minneapolis.

Daniel T. Gundersen was elected vice president-engineering and production at **J. B. Rea Co.,** Santa Monica, Calif. **Lloyd E. Schumacher** was made vice president-sales and customer relations.

Geuder, Paeschke & Frey Co., Milwaukee, appointed **Harold E. Whiteley** manufacturing manager and **Gilbert C. Gettelman** chief development engineer. Mr. Whiteley is in charge of plants in Milwaukee, Sheboygan, Wis., and Lebanon, Ind. He was Chicago works manager for Bethlehem Steel Co.

Charles C. Snider was made manager of field sales, **Consolidated Engineering Corp.,** Pasadena, Calif. He is replaced as manager of the southeastern regional sales office in Atlanta by **Joseph E. Jenkins,** former Washington district sales manager.

Dr. Karl Schumpelt was made chief metallurgist for **Sel-Rex Precious Metals Inc.,** Belleville, N. J.

Walter E. Streeter, assistant plant manager at **Kaiser Aluminum & Chemical Corp.'s** Erie, Pa., works, was named plant manager of the forging facility. He replaces **Frank J. Klima,** now forging project engineer.

Perry C. Smith was made manager, equipment department, **Brush Electronics Co.,** Cleveland, a division of Clevite Corp.

International Rustproof Corp., Cleveland, appointed **L. D. Barrett** director of research. He was chief chemist at Weatherhead Co.

Roy H. Kallas fills the new post of general manager, **Grieve-Hendry Co. Inc.,** Chicago. He was mechanical process equipment engineer with the aircraft engine division of Ford Motor Co.

Robert A. Emmett Jr. was elected vice president of **Detrex Corp.,** Detroit.

G. T. Poirier was made general manager-manufacturing, **Chrysler Division,** Chrysler Corp., Detroit.

Allen J. Dusault was made general sales manager for **Transistor Products Inc.,** Waltham, Mass., operating unit of Clevite Corp. He succeeds **E. F. Giguere,** now vice president-sales. **Samuel Rubinovitz** was made government sales manager.

Edmund J. Grady, newly elected vice president in charge of the Pacific Steel Boiler Division of **National-U. S. Radiator Corp.,** has moved his headquarters from Detroit to Johnstown, Pa. **Henry M. Gibb** was made sales manager for the division.

Federated Metals Division, American Smelting & Refining Co., transferred **George M. Baumann** to New York as assistant to **Frederick Walker. James F. McQuillan** succeeds Mr. Baumann as assistant general manager, midwestern department. **M. Robert Herman** re-

G. E. BURKS

R. C. BROWN

. . . executive positions at Caterpillar Tractor Co.

places Mr. McQuillan as manager of the Houston plant.

G. E. Burks was elected a vice president, **Caterpillar Tractor Co.**, Peoria, Ill. He continues to direct research and engineering programs. **R. C. Brown** was made director of research. He succeeds **J. M. Davies** who is now assistant to Mr. Burks with headquarters in the San Francisco office. **C. R. Maxwell**, assistant research director, also will assist Mr. Burks. He remains at the Peoria plant. **Dale Wright** succeeds **Glen C. Riegel**, retired chief metallurgist.

Lawrence J. Woods Jr. joined **Morgan Construction Co.**, Worcester, Mass., as engineer in its wire machinery division. He recently served as consultant to Revere Corp. of America and other organizations in the wire field.

Ralph G. Griffin was made manager of **Worthington Corp.'s** Cincinnati district office. He succeeds **Earle W. Vinnedge**, named special representative of that office.

W. P. Holloway was made assistant superintendent of **Wheeling Steel Corp.'s** bessemer and 44-in. blooming mill at Steubenville, O.

Wesley R. Sutton was appointed assistant chief engineer, carbide sales division, **Firth Sterling Inc.**, Pittsburgh.

John K. Stewart Jr. was made assistant to the president of **Industrial Nucleonics Corp.**, Columbus, O. He was with Bloom Engineering Co.

P. K. Barker was named general manager of **Heat-X Inc.**, Brewster, N. Y., subsidiary of Bush Mfg. Co.

J. H. Sutherland was made Chicago district manager of **SKF Industries Inc.**

In the machine tool division of **Pratt & Whitney Co. Inc.**, Hartford, Conn., **Albert L. Knapp** was named vice president-manager and **Jacob J. Jaeger** vice president-chief engineer. **Edward J. Ferris** was made general superintendent to succeed Mr. Knapp.

George E. Shoup was elected executive vice president of **Dumore Co.**, Racine, Wis.

Robert I. Ingalls, chairman of the board of **Ingalls Iron Works Co.**, Birmingham, assumes the office of president to succeed **Kenneth H. Gayle Jr.** who has retired.

William C. Russell was made general manager of the St. Louis division of **Joy Mfg. Corp.**, Pittsburgh, responsible for engineering, manufacturing and product sales. He was sales manager and chief engineer of Dodge & Seymour Ltd. of New York. **Herman Van Houten** was made sales manager, renewal parts, with headquarters in the Franklin, Pa., plant. **R. T. Hair** was made manager, continuous miner and loader products, and **Earl Bradley**, manager, shuttle car products, both with headquarters at Franklin. Other changes at the Franklin plant include: **W. Kenneth Baird** as manager of manufacturing; **J. W. Woolf**, assistant chief engineering-adminstrative; **C. W. Fitzgerald**, assistant chief engineer, product design; and **C. F. Schultz**, manager, industrial engineering.

A. S. Chivers was named sales manager of **Barry Controls Inc.**, Watertown, Mass.

Philadelphia Gear Works, Philadelphia, appointed **Peter B. Davies**

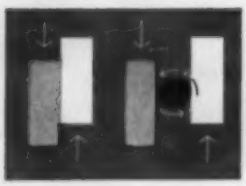
ALBERT L. KNAPP

JACOB J. JAEGER

. . . vice presidents of P&W's machine tool division

if YOU USE ACME SCREWS AND/OR SLIDING SPLINES

This message is of vital interest to you!



Using nearly frictionless rolling balls between mating surfaces, Saginaw has far outstripped the capabilities and the efficiency of conventional Acme screws and ordinary sliding splines!

The secret's simple: steel balls recirculating in closed-circuit raceways eliminate sliding friction. This principle was pioneered by Saginaw to reduce automobile steering effort.

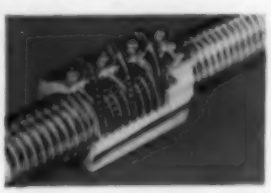
TWO TYPES OF SAGINAW *ball/bearing* SCREWS

1. *Machine-Ground Saginaw b/b Screw.* It is already being widely used in aviation, electronics and similar industries, where its ability to provide precision actuation and positioning with far greater efficiency and dependability—plus vital savings in power, weight and space—has proved a tremendous advantage. Each unit is custom-engineered for its application.

2. *Rolled-Thread Saginaw b/b Screw.* It operates on exactly the same principle but has *rolled threads,* and is mass-produced in a choice of 7 standard sizes and practically any screw length. Result: production costs have been reduced so greatly that it *costs no more—often less*—than comparable Acme screws, which are far less efficient. In many non-critical applications it will give completely adequate service.

BOTH TYPES OFFER THESE BIG ADVANTAGES:

- **At least 90% efficiency guaranteed—compared with 15% to 20% efficiency of conventional Acme screws**
- **Far less wear—less maintenance—longer life**
- **Less than ⅓ as much torque requirement as Acme screws for same amount of linear output**
- **Consequent savings in size and weight of motors and auxiliary equipment**
- **Dependable operation even without lubrication**
- **Will function smoothly at temperatures from −75° to +175° F.**



THE REVOLUTIONARY SAGINAW *ball/bearing* SPLINE

Radically increases the efficiency of transmitting or restraining high torque loads. Wherever column length must change under torque load, the *Saginaw b/b Spline* offers unprecedented freedom from conventional spline restrictions.

- **Approximately 40 times lower coefficient of friction than ordinary sliding splines**
- **Far less wear—longer life—greater dependability**
- **By reducing power, weight and space requirements, permits engineering designs hitherto impractical**
- **Dependable operation with or without lubrication, at temperatures from −75° to +175° F.**

- **Can be fitted with integral gears, clutch dogs, bearing and sprocket seats or other attachments for use with electrical, hydraulic and pneumatic units**

As with all highly successful new products, these Saginaw developments are already being imitated—but not equalled. Saginaw Steering Gear Division of General Motors Corporation—world's largest builder of steering gears—pioneered the recirculating-ball principle in America, and was the first volume producer. Saginaw offers you not only superior know-how and production facilities, but a number of original design features. Our experienced engineers are ready and eager to recommend the most advantageous applications for you.

SHOW THIS MESSAGE TO YOUR ENGINEERS TODAY—IT MAY SAVE YOU THOUSANDS OF DOLLARS AND GREATLY IMPROVE THE PERFORMANCE OF YOUR PRODUCTS

Saginaw
ball bearing
Screws & Splines

MAIL COUPON NOW FOR FULL DETAILS

Saginaw Steering Gear Division
General Motors Corporation
Dept. 13N, Saginaw, Michigan

Please send detailed information on:
☐ Saginaw b/b Screws ☐ Saginaw b/b Splines

I am interested in their application to_____

Name—Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

LEE R. ENGLISH
. . . Cleveland Tool & Die sales mgr.

JOHN D. CANTWELL
. . . Trane Co. works manager

R. A. FERGUSON
. . . Latrobe Steel div. sales mgr.

assistant sales manager, a new position.

Lee R. English was appointed sales manager of **Cleveland Tool & Die Co.** and **Cleveland Grinding Machine Co.**, Cleveland.

W. M. Asher was named sales manager for hydraulic products at **A. O. Smith Corp.'s** Pacific Coast Works, Los Angeles. **William C. Powell** was named district sales manager, tubular and process equipment division, Milwaukee.

E. W. Bliss Co. appointed **Robert Berg** chief draftsman, and **George Bearer** and **Roger Kilpatrick** sales engineers in its rolling mill division at Salem, O.

Neale Carter was assigned to the Birmingham district sales office to handle specialty steel products for **Allegheny Ludlum Steel Corp.** **Walter W. Armstead Jr.** is with tool steel sales in the Indianapolis district.

John D. Cantwell Jr. was made works manager of **Trane Co.**, La Crosse, Wis., and **John J. O'Brien** was made general superintendent. **O. C. Smevog** fills the new post of adviser to the works manager and **Ivan H. Smith** will be manager of Plant 4 in La Crosse.

Alexander C. Brown, chairman of the board of **Cleveland-Cliffs Iron Co.**, Cleveland, has relinquished his duties of chief executive officer, but will continue as chairman. Chief executive duties were assigned to **Walter A. Sterling**, president.

Miles B. Sanger was made Huntington, W. Va., district manager of **Enterprise Engine & Machinery Co.**, subsidiary of General Metals Corp.

W. H. Collins was made northeastern district sales manager for **Trent Tube Co.**, subsidiary of Crucible Steel Co. of America. He has headquarters in New York.

Latrobe Steel Co., Latrobe Pa., appointed **R. A. Ferguson** sales manager, special products division, responsible for sales of tool bits, brick mold liners and other wear parts.

W. A. Dennis was made assistant metallurgical engineer, carbon bar and semifinished unit, **United States Steel Corp.**, Pittsburgh. He succeeds **A. W. MacLaren.**

Robert P. Young was named manager, New York district office, **Peerless Pump Division**, Food Machinery & Chemical Corp. He succeeds **F. W. McCann**, resigned.

Andrew C. Freimann was named vice president-marketing for **York Corp.**, York, Pa.

Daniel J. Sheehan was made general parts and service manager, **Hyster Co.**, Portland, Oreg. **James L. Woodley** was made manager of the Danville, Ill., plant.

OBITUARIES . . .

Edward G. Miner, 91, chairman of **Pfaudler Co.**, Rochester, N. Y., died Oct. 10.

Frank N. Satter, who retired in 1953 as Cleveland district sales manager for **Midvale Co.**, died Sept. 25.

John B. Merrill, 45, a vice president-operations of **Sylvania Electric Products Inc.** at Towanda, Pa., died Oct. 6.

James E. McGarr, 45, general manager, tungsten and chemical division, **Sylvania Electric Products Inc.**, at Towanda, Pa., died Oct. 6.

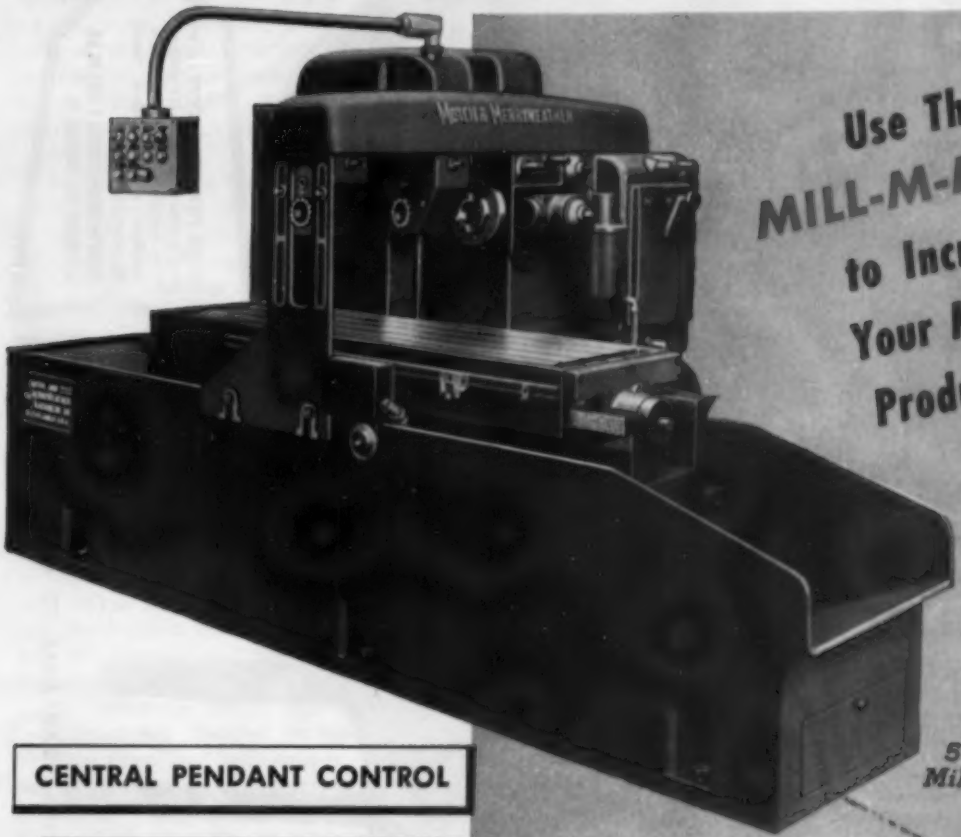
Frank F. Hopkins, 76, president and owner of **Seattle Boiler Works**, Seattle, died Oct. 2.

Herbert M. Wilson, 72, retired executive vice president, **Shenango Furnace Co.**, died Oct. 9 in Pittsburgh.

Henry C. Miller, 61, plant manager, **Strong Steam & Specialty Mfg. Co.**, Conneaut, O., died Oct. 2.

Charles E. Larson, 86, chairman, **Charles E. Larson & Sons Inc.**, Chicago, steel forging firm, died Oct. 5.

Justly Named — the Motch & Merryweather MILL-M-MATIC BED TYPE *Production* MILL



Use This MILL-M-MATIC to Increase Your Milling Production!

Model S-M-1842 Mill-M-Matic

CENTRAL PENDANT CONTROL

25 H. P. SPINDLE DRIVE

MECHANICAL TABLE FEED

AUTOMATIC TABLE CYCLES

RIGID OVER-ARM

You owe it to your production program to get all the details on this new *heavy duty* series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. . . The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of *traveling head* milling machines.

Copyrighted 1955 by The Motch & Merryweather Machinery Co.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines

This Photo is One-Third Actual Size...

OF A COMPLETE VEELOS V-BELT INVENTORY IN THE O, A, B AND C WIDTHS!

Put an end to endless space and inventory problems. Four reels of Veelos adjustable v-belt replace up to 316 different sizes of endless belts... and take up a space of only 16 inches square.

VEELOS
THE BALANCED
LINK V-BELT

Over 350 distributors throughout the country. Veelos is known as Veelink outside the United States.

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

WRITE FOR A FREE COPY... of the Veelos Data Book. It's packed with valuable engineering data complete with illustrations. Send for your copy today.

MANHEIM MANUFACTURING & BELTING CO.
613 Haubel St., Manheim, Pa.

901

Organizes Firm

Nottingham Steel & Aluminum Co. organized to take over well established business

NOTTINGHAM STEEL & Aluminum Co., a recently organized company at Cleveland has purchased the steel and aluminum warehouse business formerly conducted by Nottingham Steel Co. in Cleveland and Chicago. Price: $1.5 million.

Nottingham has the largest diversified steel and aluminum warehouse in the Cleveland area, officials of the company say. It has an annual business of $5 million.

Organizers — Earnest W. Harwell is president of the new firm. T. Stenson White is vice president. They held the same positions in the old firm. Mr. Harwell is also general manager; Mr. White, treasurer. Chairman and secretary of the new company is Guy W. Waters, president of Ohio Machine & Boiler Co. and Rausch Nut & Mfg. Co. and a director of Midwest Forge Co. Just prior to joining Nottingham Steel last February, Mr. Harwell was president of Hamilton Steel Co., Cleveland.

The company selling Nottingham Steel has changed its name to Esar Corp. and will engage in other enterprises and investments. Samuel M. Friedman, who founded Nottingham Steel Co. in 1919, is president; Richard K. Friedman, vice president.

Hollingshead Opens Plant

R. M. Hollingshead Corp. dedicated its $1-million manufacturing and distribution center in Sunnyvale, Calif. The plant is equipped to turn out maintenance chemical compounds at an annual rate of 1.5 million gal.

Integrates Carbide Production

Firth Sterling Inc., Pittsburgh, acquired a half interest in a newly formed company, Strategic Metals Corp., with facilities at Conshohocken, Pa. This firm is engaged in the chemical beneficiation of complex tungsten ores and residues into suitable feed material for Firth Sterling's ammonium paratungstate plant in Trafford, Pa. With a capacity for upgrading 150 tons of complex tungsten-bearing materials per month, the new facility further integrates Firth Sterling's production of tungsten carbide products by providing a constant source of high purity raw materials in the form of calcium tungstate.

Barry Controls Expands

Barry Controls Inc., Watertown, Mass., maker of shock and vibration isolation equipment, has launched a $300,000 expansion program. The firm is erecting a $250,000 building, containing 24,000 sq ft of floor space. Renovation of the present Barry building, containing 35,000 sq ft of space, will cost $50,000.

Will Build Aluminum Foundry

Zollner Machine Works Inc., Ft. Wayne, Ind., will construct a permanent mold aluminum foundry. Fred Zollner, president, says the foundry is intended to improve efficiency in the manufacture of pistons in the heavy-duty truck and industrial field; to produce competitively for passenger car accounts that purchase pistons in the form of castings; and to produce diversified products requiring high-strength, permanent mold castings. The project will involve an investment of more than $1 million, including equipment.

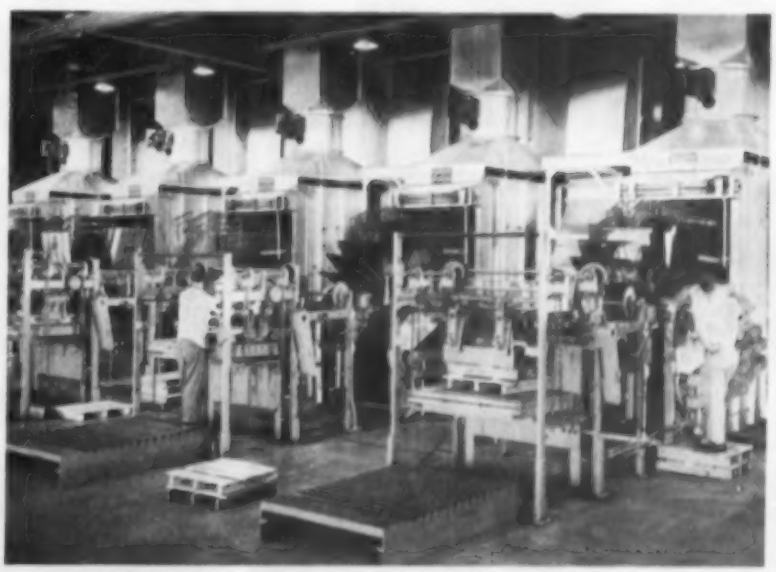
Penn Metal Sells Division

Penn Metal Corp., Philadelphia, sold its Steel Equipment Division to Alan Wood Steel Co., Conshohocken, Pa. Penn Metal retains its Highway Products Division which fabricates corrugated metal drainage pipe and accessories.

Nankervis Buys Detroit Plant

George L. Nankervis Co., builder of laboratory and production testing equipment for the automotive and aircraft industries, purchased a 72,000-sq-ft manufacturing plant formerly occupied by the Nash Division of American Motors Corp. Plans are being readied for a 12,000-sq-ft addition to the plant, which is at Fullerton and Whitcomb, Detroit. Extensive plant changes are contemplated. The Nankervis firm will move into the plant next year.

(*Please turn to page* 82)



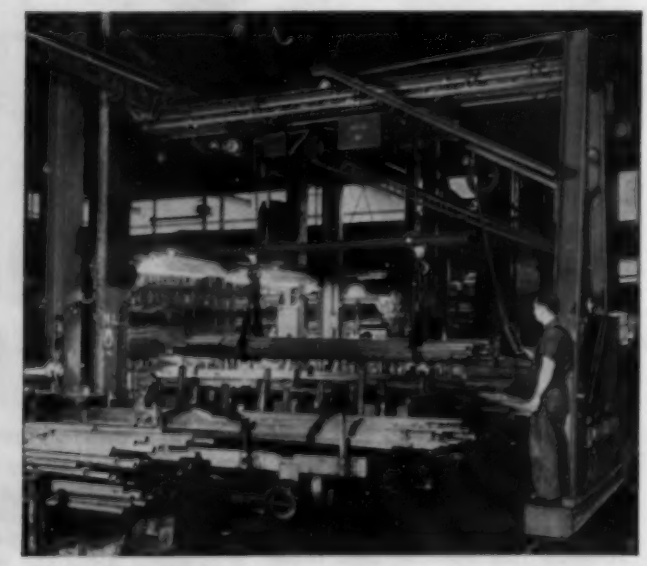
Can Manufacturer Winds Up Third Major Expansion

Coated and decorated plates are baked in these ovens at Crown Cork & Seal Co.'s new lithography plant in Baltimore. Danger of overbaking or underbaking is eliminated by the new electronically controlled equipment. Temperatures do not vary over 5 degrees, plus or minus. The firm also has begun operations in its million dollar can manufacturing plant in that city. A third major expansion this year was the opening of a can manufacturing plant in Barstow, Fla.

FOUR INTERLOCKED CRANES handle 100-foot long trusses in structural plant. Cranes are 5 tons capacity, 3-runway, 36 and 40 feet long. They operate individually or together as units. Trusses are removed from jig and advanced to next location within a few minutes by two men operating crane control buttons.

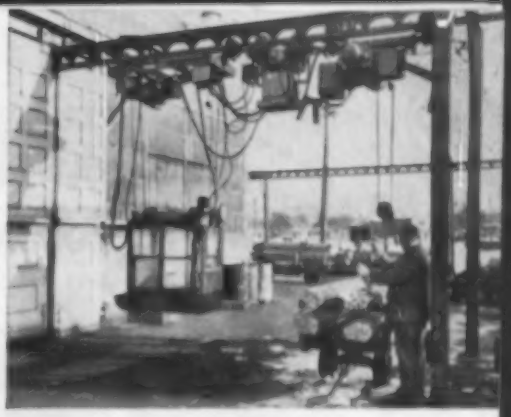
TRAMRAIL IDEAS THAT

TRACK AND CRANE SYSTEM speeds automobile body fabrication. Tramrail cranes support spot-welding equipment and move assembled bodies between departments. Up to 105 bodies are produced per 8-hour day in this particular work area.



MOTORIZED GANTRY CRANE with spreader beam provides efficient handling in local area for bundles of tubing. Gantries can be hand-propelled, or partly electrified, or completely motorized like one illustrated.

EFFICIENT CRANE COVERAGE reduces time loss of skilled workers and expensive machine tools. Hand-propelled Tramrail cranes with electric hoists are an important factor in maintaining a profitable operation in this type of shop.



RAISE-LOWER CAB CARRIER permits operator leaving cab at any point to attach hooks to materials to be transported. Floor help is unnecessary and costs are consequently held at a minimum. This unit operates both outside and inside of the building.

HAND PROPELLED CRANE with one-ton chain hoist provides overhead conveying and hoisting service at low cost. Operation is smooth and easy, with practically no maintenance.

CUT COSTS...

Whatever your handling needs, most likely versatile Cleveland Tramrail can be adapted to solve them.

In nearly every segment of industry, various forms of Cleveland Tramrail equipment are being used to advantage. In fact, over 40,000 installations are serving 9,000 companies.

The equipment speeds production, saves floor space, improves safety, reduces floor congestion — and cuts costs tremendously.

Cleveland Tramrail consists of track, switches, carriers, hoists, grabs, etc., which can be combined in a thousand-fold ways to exactly suit your need. Illustrated here are a few random examples of how the equipment is being used. Cleveland Tramrail can be furnished for simple manual operation or with any degree of electrification, including fully automated systems.

A local Cleveland Tramrail sales engineer will be glad to discuss overhead materials handling with you and show you installations at work in nearby plants. Why not get in touch with him? A card or letter to us will do the trick.

This large book is the greatest in its field. Contains a wealth of valuable information. Covers details of 143 outstanding installations. Has 426 large photos, 59 system layouts, 69 other sketches. Write for your free copy of "Cleveland Tramrail at Work" on your company letterhead. A nearby representative will deliver it without obligation.

THREE-WAY TRACK SWITCH enables this tractor-driven 5-ton electric hoist carrier to travel to various parts of a plant. This is another example of the many handling arrangements possible with Cleveland Tramrail.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7804 EAST 290th STREET WICKLIFFE, OHIO

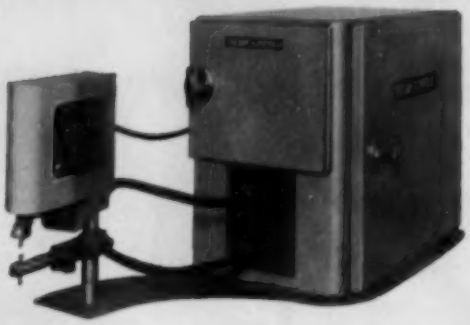
assembled bodies between departments. Up to 105 bodies are produced per 8-hour day in this particular work area.

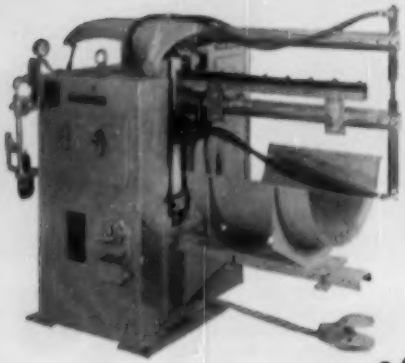
can be hand-propelled, or partly electrified, or completely motorized like one illustrated.

STANDARD ★ MODIFIED ★
SPECIAL RESISTANCE WELDERS

Standard Resistance Welder

Efficient for all basic uses; low operating cost, prompt delivery, long service.



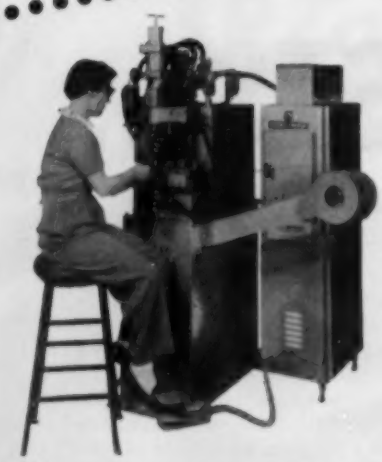


Standard Resistance Welder With Special Tooling

Modified to suit your requirements; increased production, low cost retooling.

Special Resistance Welder

Built for your specific needs; mass production of special products at lowest cost per unit.



Resistance Welders Since 1898

Sales and Service

CHARLOTTE • CHATTANOOGA
CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT
LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON
SEATTLE, WASHINGTON
ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO

TAYLOR-WINFIELD
RESISTANCE WELDERS
SPOT • PROJECTION • SEAM • FLASH-BUTT

THE TAYLOR-WINFIELD CORPORATION WARREN, OHIO

(*Concluded from page* 79)

Nankervis also announced the purchase of Commercial Research Laboratories Inc., Detroit, builder of flowmeters and related scientific equipment. The property will be operated as the Commercial Research Division.

Hycon To Build Plant

Hycon Mfg. Co. will construct a $1-million manufacturing plant at La Verne, Calif., for increased production of military and commercial electronic equipment.

Binks Mfg. Enlarges Facilities

Binks Mfg. Co. is increasing its Franklin Park, Ill., plant by 15,552 sq ft. The addition will house enlarged operations of pipe fabrication, air compressor manufacturing facilities and the sheet metal engineering department. Object: Increased production of spray painting booths, water cooling towers and air compressors.

Walworth Buys Valve Firm

Walworth Co., New York, purchased Alloy Steel Products Co. Inc., Linden, N. J., maker of stainless steel and other corrosion-resistant alloy valves. This is another step in Walworth's program of diversification and expansion. The Linden firm will be operated as an independent subsidiary.

Baker Bros. Opens Branch

Baker Bros. Inc., Toledo, O., maker of drilling, boring and tapping machines, opened a sales and engineering division office at 15414 W. Warren, Dearborn, Mich. The office is headed by John P. Nugent, district sales manager.

Biddle Completes Expansion

Biddle Screw Products Co., Sheridan, Ind., completed a plant expansion program involving more than $250,000. The firm makes screw machine products. Its facilities include all secondary operations such as drilling, milling, tapping, boring, broaching, lapping, honing and internal, external, centerless and surface grinding. Facilities also include heat

sentative will deliver it without obligation. 7804 EAST 290th STREET WICKLIFFE, OHIO

85,000 Sling Users Liked the First Edition ... NOW

FREE!

New expanded edition of our Famous **Tuffy Sling** Handbook... Mail coupon for copy today!

Tuffy's really tough. Bend it, loop it, jerk it. Tuffy's 9-part machine braided construction resists kinking. But if you are able to kink it by hand, see how easy it is to straighten out without damage.

Tuffy's pressed-on and swaged end ferrule eliminates rough edges that snag or catch. Smoothed edges protect hands, speed loading. Tucked-in splice is covered by new pressed-on ferrule—has 100 per cent of rated strength of the sling itself!

If you're a plant engineer, safety engineer, purchasing agent—if you use or buy slings—you need this new, enlarged edition of the most popular sling handbook ever published!

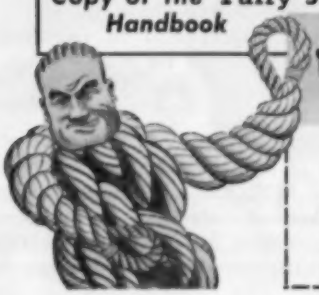
New types of factory fitted slings have been added to the Tuffy line. Now, old and new types are all made with a heavy walled steel ferrule. Ends of the ferrule are swaged flush with the machine braided strands leaving no projections to snag on loads. Many of the fittings—clamps, hooks, bridles, thimbles, saddles—are new, too. And this latest edition of the Tuffy Sling Handbook contains a host of other information you want and need for your job: a complete rigger's manual, authorized ratings and specifications for all Tuffy Slings; a new engineer's notebook; data tables on nearly a dozen versatile, easy-to-apply sling fittings.

But don't delay to order your FREE copy. Mail the coupon to us now. We'll send yours to you immediately.

CONSULT YOUR DISTRIBUTOR

when you want to buy Tuffy Slings or Tuffy Hoist lines to team up with your Tuffy Slings. Give him your requirements. He'll stock an inventory for you to draw against.

Mail Coupon For Your Free Copy of the Tuffy Sling Handbook



union Wire Rope **corporation**

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

2160 Manchester Avenue, Kansas City 24, Missouri

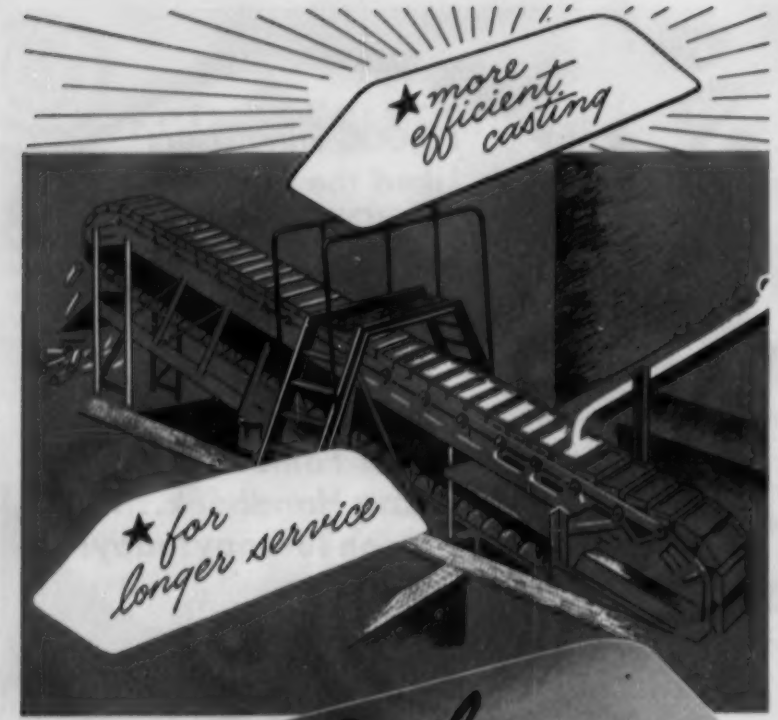
MY NAME_____ TITLE_____

COMPANY NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

11



Bailey
PIG CASTING MACHINES

- 80% of moving parts eliminated by stationary wheel design
- Capacities from 3 to 50 tons per hour
- Lengths: 15 to 125 feet, in multiples of 5 feet
- Furnaces can be tapped direct into the machine—eliminating the furnace-to-ladle operation.

Foundries and small capacity metal producing operations particularly benefit from the simplified design of these machines. The unique stationary wheels are the basic reason why the machines assure much more efficient casting and far longer service. In this design the idler wheels are mounted on the frame, rather than on the moulds, thus keeping them as far as possible from the hot metal. Completely self-contained, the unit includes the machine proper, a motor gear unit, and a variable speed reducer and drive.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

treating and oxide finishing. Some 3 million lb of various grades of steel are maintained in inventory.

AiResearch Enlarges Plant

Garrett Corp., Los Angeles, launched a $400,000 factory and office building program for its AiResearch Mfg. Division at Phoenix, Ariz. The expansion will add 37,000 sq ft to its plant.

Dahlen Engineering Expands

Dahlen Engineering Co., Santa Barbara, Calif., constructed a 50,000-sq-ft plant for increased production of machine tools and small electronic equipment.

REPRESENTATIVES

Trane Co., La Crosse, Wis., maker of air conditioning, heating, ventilating and heat-transfer equipment, appointed Joseph Wait to its Washington sales office.

George Sall Metals Co. Inc., Philadelphia, appointed M. R. Petersen, Cleveland, sales engineer in the Ohio territory. Sall Metals produces ingot metal for the foundry and diecasting industries.

Hydra-Feed Machine Tool Co., Ferndale, Mich., appointed Blackman & Neutzel Machinery Co., St. Louis, to handle its automatic and tracer lathes in the south-central states.

Brass & Copper Sales Inc., Philadelphia, has been appointed warehouse distributor for wrought beryllium copper products manufactured by **Beryllium Corp.**, Reading, Pa.

National Valve & Mfg. Co., Pittsburgh, fabricator and erector of power plant and industrial piping, is now represented in the New England district by Power Equipment Sales Inc., Boston.

The Schenectady, N.Y., branch office of Syracuse Supply Co., Syracuse, N.Y., has been designated an authorized distributor by **Carboloy Department of General Electric Co.**, Detroit. The branch office is

THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

ROEBLING

Royal Blue

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

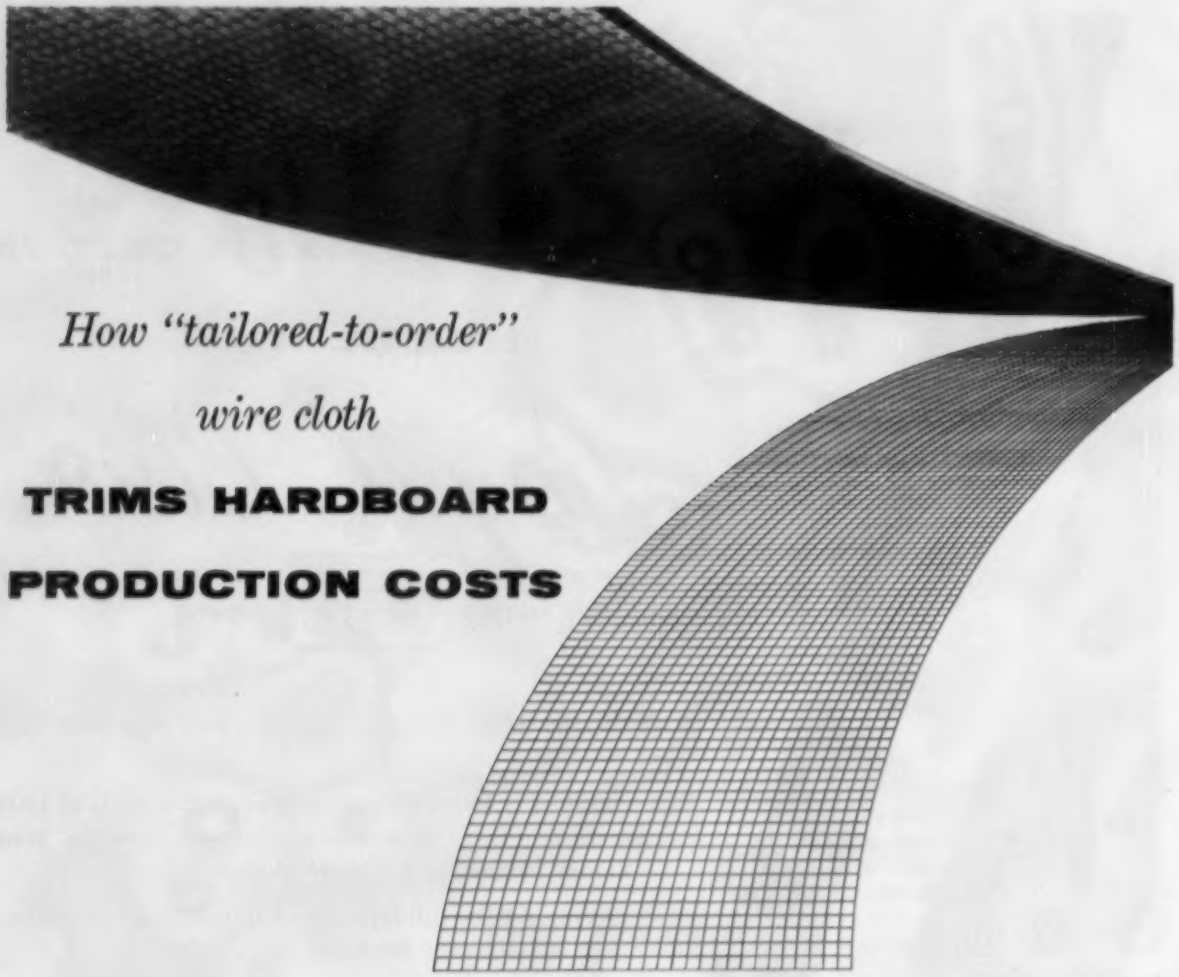
Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

Ask us for the full facts about Royal Blue Wire Rope, or contact your Roebling distributor.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2359 FREDONIA AVE. • CLEVELAND, 19325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST. AVE. S. • TULSA, 321 N. CHEYENNE ST.
EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.



How "tailored-to-order"

wire cloth

TRIMS HARDBOARD PRODUCTION COSTS

• There's a tell-tale pattern on the back of a leading brand of hardboard. It was left there by a *new* kind of wire cloth, developed by the *Reynolds Wire Division* of National-Standard—developed because their customer had a problem which, as usual, Reynolds solved.

In this hardboard manufacture, wire cloth carries the heavy wet compound, supports the material during pressing, and pulls out the hardened boards, while being stripped away from the big boards by force. The stress is terrific! In fact there *was* no wire cloth that would hold up. It failed too often, requiring frequent replacement, slowing production and adding to costs.

But now all that is past . . . because Reynolds tackled the problem and came up with a radically new cloth construction. So unusual was the cloth that Reynolds even had to build special looms to produce it.

Here again is an example of the lengths to which Reynolds *often* goes to help customers save money, produce better products, or both! But problem or no problem, if you *use* wire cloth, or want to check on its use, you'll find Reynolds' kind of service and cooperation always pays off. Try us and see.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth
WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

headed by P. B. Scott. The organization will handle Carboloy's line of standard and special carbide metal cutting tools, as well as its diamond grinding wheel dressers.

NEW ADDRESSES

Detroit Reamer & Tool Co. moved into its new plant and offices at 780 W. Maple Rd., P. O. Box 174, Birmingham, Mich.

West Instrument Corp., maker of temperature control equipment, moved to 4363 W. Montrose Ave., Chicago 41, Ill.

ANNIVERSARIES

Acorn Iron & Supply Co., Philadelphia, is celebrating its 50th anniversary this year. The company still operates under the leadership of its founder, Samuel Tabas. Chief business of the firm: Designing, fabricating and erecting structural steel and distribution of builders' products.

ASSOCIATIONS

Russell L. Sears resigned as vice president and general sales manager of Lynch Corp. His new post: Executive director of the **Packaging Machinery Manufacturers Institute Inc.,** New York.

Permanent officers of **Tri-State Structural Steel Fabricators Association** are: President, O. E. Guibert Jr., vice president and general manager, Guibert Steel Co., Pittsburgh; vice president, C. M. Ruth Sr., president, Dauphin Steel & Engineering Co., Harrisburg, Pa.; secretary, G. E. Klingelhofer, vice president and secretary, Pittsburgh Bridge & Iron Works, Pittsburgh; treasurer, A. P. Levinson, president, Levinson Steel Co., Pittsburgh. This new association has 25 charter members which are structural steel fabricating firms in Pennsylvania, Ohio and West Virginia. Association's address: 1601 Union Bank Bldg., Pittsburgh 22, Pa.

$600,000 BLAZE SWEEPS THE HERALD WAREHOUSE
45 FIREMEN OVERCOME
18 DIE, 37 HURT, 16 MISSING IN FACTORY FIRE
Blast, Flames Raze Plant
$3,000,000 DAM
Production Bottleneck
100% fire safety, 100% of the time is the responsibility of administrative and plant operating management alike. A small fire can become a big fire . . . a business-destroying fire, when maximum protection is not provided 24 hours a day, every day of the year.
No protective method yet devised exceeds the value of ENGINEERED "Automatic" Sprinkler PROTECTION. It never tires — never sleeps — never takes time off. It's always ready to feel fire . . . to shout fire . . . to kill fire, whenever your plant production is threatened.
No one profits from fire loss, but you can profit in more ways than one, when ENGINEERED "Automatic" Sprinkler PROTECTION safeguards production bottlenecks in your business. Let us show you how!
FIRE DESTROYS PORTION OF STOCKYARD
DAMAGE RUNNING CLOSE TO $600,000
"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO
Offices in principal cities of North and South America
PLANT DESTROYED BY FIRE
FLOUR MILL FIRE LOSS ESTIMATED AT $1,000,000

Behind the Label ...a big story

Last April, Alcoa launched a broad new program to help its manufacturing customers sell their aluminum products. Spearhead of this program is the label shown above, which is given to manufacturers who make light, lasting products containing Alcoa® Aluminum Mill Products. With the backing of a promotion program that includes hundreds of millions of advertising messages in 1955 alone, this label is building sales for hundreds of aluminum products that range from air diffusers to zippers.

When you rely on your nearby Alcoa Distributor for aluminum, you benefit by 67 years of Alcoa pioneering in research and development.

You get prompt delivery, straight from warehouse stocks, in sizes that make production faster and more economical.

But the biggest aluminum news of the year is this: You can mark what you make with the new label that is America's new guide to aluminum value in light, lasting products for easier living. ALUMINUM COMPANY OF AMERICA, 876-K Alcoa Building, Pittsburgh 19, Pennsylvania.

FASTEN ALUMINUM WITH ALCOA ALUMINUM FASTENERS

ALABAMA
Birmingham
Hinkle Supply Co.

ARIZONA
Phoenix
Ducommun Metals & Supply Co.

CALIFORNIA
Berkeley
Ducommun Metals & Supply Co.
Los Angeles
Ducommun Metals & Supply Co.
Pacific Metals Company, Ltd.
San Diego
Ducommun Metals & Supply Co.
San Francisco
Pacific Metals Company, Ltd.

COLORADO
Denver
M. L. Foss, Inc.
Marsh Steel Corp.
Metal Goods Corp.

CONNECTICUT
Milford
Edgcomb Steel of New England, Incorporated

FLORIDA
Jacksonville
Florida Metals, Inc.
Miami
Florida Metals, Inc.
Tampa
Florida Metals, Inc.

GEORGIA
Atlanta
J. M. Tull Metal & Supply Co., Inc.

IDAHO
Boise
Pacific Metal Co.

ILLINOIS
Chicago
Central Steel & Wire Company
Carey Steel Co.
Steel Sales Corp.

INDIANA
Indianapolis
Steel Sales Co. of Indiana, Inc.

KANSAS
Wichita
Marsh Steel Corp.
Metal Goods Corp.

KENTUCKY
Louisville
Williams & Co., Inc.

LOUISIANA
New Orleans
Metal Goods Corp.

MARYLAND
Baltimore
Whitehead Metal Products Co., Inc.

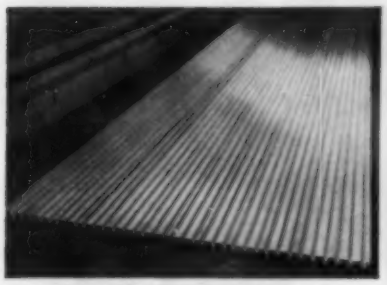
MASSACHUSETTS
Boston
Austin-Hastings Co.
Cambridge
Whitehead Metal Products Co., Inc.
Roxbury
Eastern Metal Mill Products Company

MICHIGAN
Detroit
Central Steel & Wire Company
Steel Sales Co. of Michigan

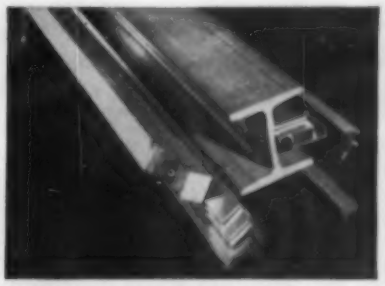
MINNESOTA
Minneapolis
Steel Sales Co. of Minnesota

MISSOURI
Kansas City, North
Marsh Steel Corp.
Metal Goods Corp.
St. Louis
Metal Goods Corp.

NEW HAMPSHIRE
Nashua
Edgcomb Steel of New England, Inc.



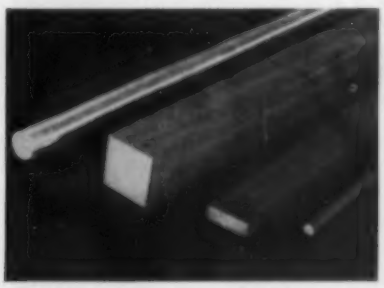
EXTRUDED SHAPES: For truck and trailer floors; thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; channels; tees; zees; etc.



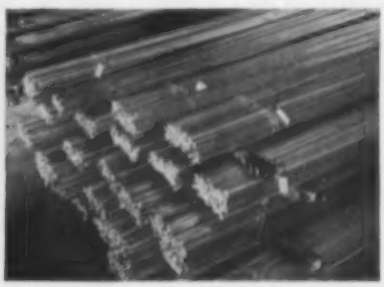
STANDARD STRUCTURAL SHAPES: Equal angles; unequal angles; channels; I-beams; tees; zees. Suited to a variety of structural applications.

SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.

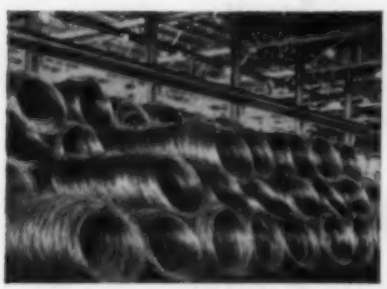
TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; furniture tube; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.



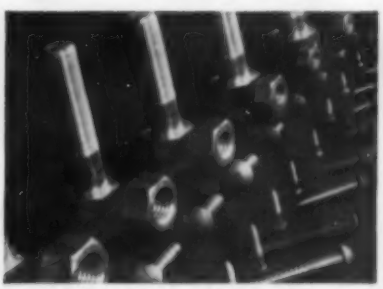
BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Either cold or rolled finished to final dimensions for superior tolerance and finish.



SCREW MACHINE STOCK: Available in 2011-T3, 2011-T8, and 2017-T4, round or hexagonal.



WIRE: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.



FASTENERS: Machine screws; wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.

YOUR ALCOA DISTRIBUTOR carries a complete line of Alcoa Aluminum Mill Products in warehouse stocks ready for prompt delivery. He's as easy to reach as your telephone. Look below for his name.

Your Guide to Aluminum Value

ALCOA ALUMINUM MILL PRODUCTS

NEW JERSEY
Harrison
Whitehead Metal Products Co., Inc.
Hillside
Miller Steel Co.
Kenilworth
Kenilworth Steel Co.

NEW YORK
Albany
Eastern Brace-Mueller-Huntley, Inc.
Buffalo
Brace-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.

New York
(L.I.City) Adam Metal Supply Co., Inc.
Eastern Brass & Copper Co.
Henry B. Lust (Circles)
Manhattan Brass & Copper Co.
Straits Aluminum Company, Inc.
Whitehead Metal Products Co., Inc.

Rochester
Brace-Mueller-Huntley, Inc.
Metal Supply, Inc.
Sachs Metal Supply Company

Syracuse
Brace-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.

NORTH CAROLINA
Charlotte
Edgcomb Steel Co.

OHIO
Cincinnati
Central Steel & Wire Co.
Williams & Co., Inc.
Cleveland
Jones & Laughlin Steel Corp.
The Hamilton Steel Warehouse
Williams & Co., Inc.
Columbus
Williams & Co., Inc.
Dayton
Ohio Metal & Manufacturing Co.
Toledo
Williams & Co., Inc.

OKLAHOMA
Tulsa
Metal Goods Corp.

OREGON
Portland
Pacific Metal Co.

PENNSYLVANIA
Philadelphia
Edgcomb Steel Co.
Metal Supply Co.
Whitehead Metal Products Co., Inc.
Pittsburgh
Williams & Co., Inc.
York
Edgcomb Steel Co.

TENNESSEE
Memphis
Metal Goods Corp.

TEXAS
Dallas
Metal Goods Corp.
Houston
Metal Goods Corp.

UTAH
Salt Lake City
Pacific Metals Company, Ltd.

WASHINGTON
Seattle
Pacific Metal Co.

WISCONSIN
Milwaukee
Central Steel & Wire Company
Steel Sales Co. of Wisconsin

Suffering from mechanical dystrophy?

℞ — *a generous dose of creative engineering*

If slow deliveries and high prices are constantly robbing you of business. Stop. Look around. Your plant may be suffering from mechanical dystrophy. An injection of new production equipment may be just what the doctor ordered.

For example, Taft-Peirce creative engineering helped a typewriter manufacturer to *increase* production and *lower* costs with new automatic inspection machinery. Special profiling machines *improved* one watchmaker's competitive position. A special machine that automatically grinds, sharpens, strops, and hones helped a razor blade manufacturer to larger profits.

Perhaps some special machinery tailored to *your* needs can help your plant. We'll be glad to discuss it with you . . . and show you how. As a starter, send for our 92 page booklet, "Take It To Taft-Peirce".

We'll Design It . . . Some typical design assists by T-P engineers — a silent typewriter, automobile engine, automatic lens grinders, countless machine-tools and smaller mechanisms.

Tool It . . . Several large corporations rely exclusively on the T-P Toolroom for tool design and manufacture.

Make It . . . 1500 machine tools . . . 450,000 square feet of plant — provide the facilities for anything from a single simple part to thousands of complex units.

Test It . . . A separate production line may be set up in sequence operation — from manufacturing through assembly, test, and final inspection.

Ship It . . . Taft-Peirce offers you all or any part of these services.

For Engineering, Tooling, Contract Manufacturing

TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R. I.

TELEPHONE: WOONSOCKET 1

9

STEEL's 1955 Management Series . . .

The editors of STEEL herewith present the ninth in their ten-part series, Program for Management for 1955. The complete list:

1. **Product Communication** (Feb. 14, p. 73)
2. **Cut Costs To Preserve Profits** (Mar. 14, p. 93)
3. **Better Plant Layout** (Apr. 18, p. 93)
4. **Business Communication** (May 16, p. 103)
5. **When To Re-Equip** (June 20, p. 99)
6. **Put Business Trends To Work** (July 18, p. 93)
7. **Business Consultants** (Aug. 15, p. 123)
8. **Value Analysis** (Sept. 19, p. 101)
9. **Market Facts** (Oct. 24, p. 91)
10. **Keep Your Product Growing** (Nov. 14)

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Market Facts:

Where you find them and how to use them

SOME of the most exciting (and rewarding) prospecting being done today doesn't call for the services of a pick and shovel or a Geiger counter. Pay dirt is business gold —market facts that can be the difference between following or leading in a competitive economy.

This article maps some sources of market facts and suggests ways you can put them to work.

In spite of the urgency, you still have time to stake your claim. "It has always shocked me to see the wealth of collected facts that are simply ignored," says Vergil D. Reed, vice president and associate director of research, J. Walter Thompson Co., New York. "Even worse, their existence is rather generally unknown."

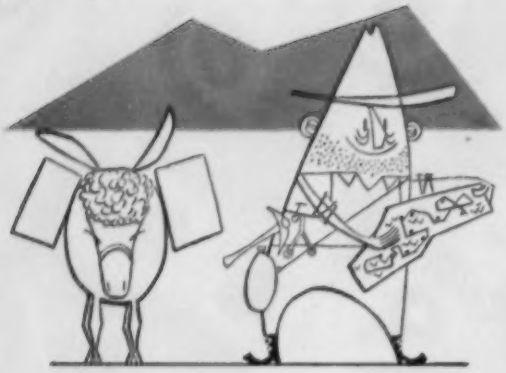
Another Voice — The American Marketing Association bears out Mr. Reed. It found that many businessmen still fail to see the value of ferreting out market facts and putting them to work. The association concluded:

"Today, the increasing magnitude and complexity of business operations and the rapidity of changes in our economy make the planning and control of sales operations greater than ever before. Planning and control are important for attaining expansion of the economy and stability and efficiency in marketing."

Effective planning and control must be preceded by the collection and interpretation of market facts (see STEEL, July 18, p. 93). Running a business by intuition has become dangerous because too many people are using the scientific approach.

Payoff—The American Marketing Association queried 4700 members in its survey. Replies disclosed eight major ways management puts market facts to work:

1. Economic or sales forecasting. 2. Analysis of market potentials. 3. Analysis of distribution. 4. Layout of sales territories. 5. Analysis of sales performance. 6. Location of plants. 7. Location of



Ten Stops in the Search for Market Facts

THERE ARE THREE broad sources for market facts: Data in company files; material already gathered by outside organizations; facts gathered through field investigation.

If the first two are used correctly, it is often unnecessary to resort to the third, which is more expensive and time consuming.

Each company must determine what information it has. Usually, the most rewarding departments are sales and production. The problem is not so simple when it comes to outside sources. There are literally hundreds of them. Most market facts can be obtained from these:

1. *Federal government*—This is probably the best over-all source, with the Commerce department in the forefront, followed by the Interior and Labor departments and such independent agencies as the Council of Economic Advisors, Interstate Commerce Commission and Small Business Administration. Most of this information is available from the 33 field offices of the Commerce department and its co-operating offices.

2. *Trade associations*—There are over 450 metal products associations. Many collect current industry statistics and other marketing information. Their names and addresses can be found in *National Associations of the United States*, published by the Department of Commerce.

3. *Business press*—Over 1800 business magazines give you the latest information available from private and government sources and their own research departments. Special articles in each issue are valuable sources. Special yearbook issues contain collections of statistics valuable to industry.

4. *Libraries*—Many public libraries in larger cities maintain a business division. In addition, the government has over 550 depository libraries.

5. *Chambers of Commerce*—They are taking a more active part in the survey of market potentials within their areas in an effort to attract new industries.

6. *Banks*—Both Federal Reserve and private banks are active in the collection of market information.

7. *Universities*—Many maintain business bureaus which issue periodic and special reports on business conditions.

8. *Public utilities*—Because they serve industry across the board, these companies take an active interest in business conditions. They have a wealth of material for the asking.

9. *State and local governments*—These agencies make special studies on local and regional problems.

10. *Research organizations*—The National Industrial Conference Board and the 20th Century Fund are good examples of organizations which do original research.

warehouses or stores. 8. Determination of samples in marketing research studies.

Market facts can be helpful in summarizing sales calls, job analyses, compilation of customer lists and sales compensation studies. In the development of new products, the proper facts are essential in determining just what products to produce, how to promote them and what price to charge.

Search the Knapsack

A company doesn't have to be in the "Billion Dollar Club" to avail itself of market facts. Much of the information is free or available for a trifle. In digging, don't overlook the nuggets of gold in your company files.

Charles W. Smith, McKinsey & Co., management consultants in New York, says the most reliable source of information for analysis of a company's distribution operations is its internal records—orders received, sales billed, customer sales records, salesmen's call reports, inquiries, complaints and company reports summarizing operations by functions.

Mr. Smith cautions against using such information by itself. "Its true significance," he says, "can often be seen only by comparison with outside data. For example, a company may be losing competitive position year by year even though its volume may be steadily increasing."

Where To Look

Finding all available sources for market information is a task that would prove overwhelming, and in most cases, unnecessary. Many sources overlap. Some are of value to only a particular industry or type of operation.

The most current is the Commerce department's *Survey of Current Business*. Issued monthly, it includes about 2500 statistical series covering general business indicators, commodity prices, construction and real estate, domestic trade, employment and population, finance, international transactions of the United States, transportation and communications and pertinent data for manufacturing in-

dustries on a national basis. Each issue carries articles on the business situation and special segments of the economy. Weekly bulletins contain the latest information.

The chief supplements to the *Survey of Current Business* are *National Income,* 1954; *Income Distribution;* and the biennial *Business Statistics,* a new edition of which was released last month.

The Bureau of the Census is the prime source for much of industry's data. The American Marketing Association survey mentioned earlier indicated that the censuses of population, business and manufacturers are most important. The Census of Agriculture is of value in determining markets for agricultural equipment. These studies give a detailed breakdown of industry by products, type of operations, size and industry groups.

The county and city breakdown is the most practical in alignment of sales territories. *County Business Patterns* and *County and City Data Book* are of particular value in sales and distribution problems. The *County and City Data Book* contains 128 series of statistics for each county and 170 standard metropolitan areas and an additional 133 series for 484 cities.

County Business Patterns, most recently published for the first quarter of 1953, has figures on employment, taxable payrolls and the number of reporting units distributed by employee size for about 175 of the Standard Industrial Classification industries.

This kind of information can help in judging sales potentials, quotas of salesmen, performance of salesmen, potential growth of markets, best methods of distribution and many other policy matters. It can be of value in deciding on plant location by comparing areas by size and quality of labor force, earnings of workers, retail and wholesale outlets and the number of plants using your product.

The standard reference work of the Census bureau is the *Statistical Abstract of the United States.* Published annually, it summarizes information which has been collected and revised by the bureau over the past year. It is limited to the main categories of statistics on a national basis, but it is

Getting the Pulse of the Marketplace

YOU can keep your finger on the market situation in your industry by following the series of periodicals put out by the Bureau of the Census.

Facts for Industry, the name of the service, covers 74 industries.

Thirty-four of these Facts for Industry reports contain information metalworking management can use (see below).

Write: Director, Bureau of the Census, Washington 25, D. C.

PRIMARY METALS

	Series Number	Price per copy	Price per year
Iron & Steel Foundries & Steel Ingot Producers—monthly	M21C	.10	
Iron & Steel Castings & Steel Ingots—monthly	M21-1	.10	$1
Steel Mill Products—annual	M22B	.10	
Steel Forgings—monthly	M22C	.10	$1
Nonferrous Castings—monthly	M24E	.10	$1
Aluminum & Magnesium Mill Products—monthly	M24-1	.10	$1
Copper-Base Mill & Foundry Products—quarterly	BDSAF-84	.10	.35
Aluminum Forgings—annual	BDSAF-239	.10	

INTERMEDIATE METAL PRODUCTS

Steel Power Boilers—annual	M25A	.10	
Aluminum Foil, Converted—annual	M34P	.10	
Plumbing Fixtures—quarterly	M51H	.10	.35
Heating & Cooking Equipment—monthly	M51N	.10	$1
Steel Shipping Barrels, Drums & Pails—monthly	M75A	.10	$1
Closures for Glass Containers & Crowns—monthly	M75C	.10	$1
Metal Cans—monthly	M75D	.10	$1

MACHINERY AND TRANSPORTATION EQUIPMENT

Farm Pumps—monthly	M31B	.10	$1
Fans, Blowers & Unit Heaters—quarterly	M31E	.10	.35
Internal Combustion Engines—annual	M31L	.10	
Electric Lamps—quarterly	M32B	.10	.35
Machine Tools—annual	M34A	.10	
Metalworking Machinery (except machine tools)—annual	M34C	.10	
Farm Machines & Equipment—annual	M35A	.15	
Office Machines—annual	M35B	.10	
Construction Machinery—quarterly	M36A	.10	.35
Radios, Television & Phonographs—annual	M36M	.10	
Tractors (except garden type)—monthly	M37B	.10	$1
Complete Aircraft & Aircraft Engines—monthly	M42A	.10	
Backlog of Orders for Aircraft Companies—quarterly	M42D	.10	$1.45
Aircraft Propellers—semiannual	M42E	.10	
Truck Trailers—monthly	M45F	.10	$1
Mechanical Stokers—annual	M51B	.10	
Refrigeration Equipment—annual	M52A	.10	
Metalworking Machinery—quarterly	BDSAF-173	.10	.35

NONMETALLIC MINERALS PRODUCTS

Refractories—annual	M27C	.10	

of special value in pointing out the original source.

Use Your Association

One of the most current sources of market facts by industry is the trade association. The metalworking industry has more than 450 national associations, many of which collect and distribute data on conditions within the industry to members.

Subscriptions to a number of good business magazines is a must for the market researcher. These publications present up-to-date reports on business conditions. They are on the mailing lists of most sources of market data and often publish information you can't get otherwise. There are more than 1800 business papers.

Most business publications do original research on market problems, the results of which they publish or furnish at cost to readers. A number publish yearbook issues which contain summaries of market statistics. A good example of the services offered is Penton's Continuing Census of the Metalworking Industry and its book, ***Metalworking Markets in the United States.*** This book gives the latest available information on products manufactured, operations performed, size of plant and geographic location of metalworking plants in the U. S.

Secondary Diggings

When a good prospector reaches the end of his high-grade vein, he turns to lower-grade ores which still contain a great deal of wealth. So it is with the market researcher. He has many secondary sources.

For example, the Business & Defense Services Administration is composed of 25 industry divisions, 19 of which are of direct interest to metalworking. These divisions evaluate trends and study trade practices in the industries they represent. BDSA's ***Distribution Data Guide,*** a monthly bulletin, is a current and annotated bibliography of governmental and nongovernmental materials available for market and distribution studies.

The Small Business Administra-

Visualize Your Sales

MAPS like the one below can be valuable sources of market data. Not only do they help in pinpointing markets, but they also aid in visualizing the full scope of industrial activity. They are of maximum value when subdivided on a county, state or regional basis—the geographical boundaries most used in sales and distribution systems. Most market data are collected this way.

While this map is based on information about the

and Distribution Systems on Marketing Maps

metalworking industry, others are available for other industries plus retail and wholesale markets. A comprehensive listing of these maps is found in the Small Business Administration's *Business Service Bulletin No. 18*, obtainable at any Department of Commerce field office.

It is possible to work out your map for any specific segment of industry for which sufficient data are available. Blank outlines for this purpose can be obtained from: Geological Survey, Department of the Interior, Washington 25, D. C. By comparing your own marketing data with that on the industry map, you can get a quick appraisal of your position.

The map below is in six colors and is available upon request until the supply is exhausted. Address requests to Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Metalworking Markets in the U. S.
There are 34,644 metalworking plants (employing 20 or more) in the U.S. These plants, which account for about 97% of the business done by the entire Metalworking industry, are located in 1,177 of the 3,103 counties in the United States.
NUMBER OF METALWORKING PLANTS IN THE U.S.

tion issues a series called the Business Service Bulletin, which is helpful in locating many types of market facts. SBA also publishes a series called Management Aids for Small Manufacturers. It shouldn't be overlooked.

If your problem lies in the field of foreign commerce, the *Foreign Commerce Weekly* is a must. The Bureau of Foreign Commerce's Business Information and World Trade Information services should be checked for market conditions and legal matters concerning international trade.

As a source of market information in the government, the Bureau of Labor Statistics is second only to the Commerce department. The completeness of its price relatives and indexes is not duplicated. Its figures on employment and earnings are of great value in determining market potentials.

The Department of Interior, through its Bureau of Mines, surveys America's mineral resources. In addition to helping some industries locate near a source of supply, these statistics enable businessmen to keep a close watch on fluctuations in supply and consumption of basic raw materials and adjust their operations accordingly.

The Council of Economic Advisors issues a series called Economic Indicators, which is a good reference in checking trends in the markets. The Interstate Commerce Commission is valuable as a source of information when comparing methods of transportation and distribution.

There are many good sources in private and public organizations. Banks, universities and public utilities are among the best. The *Harvard Business Review* and Ohio State University's *Bulletin of Business Research* are among the many university publications often referred to. Some universities are active in developing market studies for small businesses and other groups in their localities.

The Monthly Letter on Business and Economic Conditions published by the First National City

"A Full-Scale Survey Wasn't Required"

THAT'S HOW Gordon Weaver (see photo) winds up his story on how his company found the market potential for a new product. "Nevertheless," he adds, "management's decision was based solidly on well-chosen market facts."

Mr. Weaver is the director of market research for Clevite Corp., Cleveland. The new product: Electrodeposited copper sheet, the extremely thin material used in printed circuits for electronic equipment.

Here's how Clevite took the short cut.

Preliminary study showed the company's ability to make the product, that it fit into its existing sales and distribution organizations.

"At this point," explains Mr. Weaver, "a wide field study is required in many cases to determine the market potential. But before going to this expense, much can be learned from available information. Generally, this department starts with government figures—*Facts for Industry*, *Census of Manufactures* and the like. A quick check of the *Standard Industrial Classification Manual* told us that the government's category for foil was too broad. Any statistical information from that source was of no help in this case.

"So our starting point had to be an estimate made by the Defense department for the use of copper sheet in printed circuits. We also knew that the government desired more capacity to assure it of meeting its needs."

There was only one other producer of the sheet. Clevite officials dug into that company's annual report and found that it was increasing its capacity. The size of the expansion gave an indication of present capacity and rate of growth in demand.

A Small Business Administration bulletin directed the researchers to more information compiled by the National Bureau of Standards. This helped not only in technical development of the product but also in further affirming the active interest in thin copper sheet.

In tracking down this interest, Clevite used three basic tools: The business press, industrial directories and a trade show. "By clipping articles and ads from such magazines as STEEL and *Electrical Manufacturing*, we came up with many leads on the users of the product. You'd be surprised how much market information you can get from the ads in business papers," Mr. Weaver adds.

Thomas' Register of American Manufacturers, *Electronics Buyers' Guide* and state industrial directories added to the list. By talking with electronics men at the Institute of Radio Engineers show this summer, the list grew in impressive proportions.

The big surprise of this search was that a second user, manufacturers of laminated copper insulation for construction, made up the bulk of the list. To Clevite, this meant a large market for the basic material, either in peace or war. The market research department followed up on each name. It obtained not only product information but also considerable market research data which some of these companies had developed by themselves.

On the basis of this survey, plus information derived from earlier patent searches and technical studies, Clevite decided to enter the market.

Bank of New York and the Cleveland Trust Co. *Business Bulletin* are outstanding examples of material available from local banks. The Federal Reserve System, through both its 12 district banks and the Board of Governors, issues periodic bulletins on business conditions, especially finance.

Public utilities, which are vitally interested in industry because of the power they use, are usually good sources of market data on a local or regional basis. Practically every plant relocation study should include a check with these people.

Short Cuts

It is readily apparent that the sources for market facts are legion. However, there are short cuts that you can take in getting this information. The nearest field office of the Commerce department is one of the best. Each office is a clearing house for most of the government's market data and a great deal of nongovernmental material. Each is staffed by experts familiar with the sources and the best way to use them.

If it is inconvenient for you to go to a field office, the department has working agreements with over 900 co-operative offices throughout the country. Most of these offices are in cities of 25,000 population or more. It is standard practice for them to refer problems they cannot handle to the field offices. A good way to keep tab on what the Commerce department has to offer through any of these offices is to subscribe to the *Business Service Checklist*, a weekly bulletin listing current publications. Cost: $1.25 a year.

In cities having a well organized public library, chances are good that you can get much of your market information from the business information section. Many have a good portion of the materials listed here.

In case your own public library can't help, you can't be too far from one of the more than 550 government depository libraries. They receive the bulk of the material prepared by the government, which is available to businessmen

Market Research: A Matter of Self-Appraisal

SCIAKY BROS. INC. faced a major shift in its sales program in 1953. During the Korean War, practically all production of the Chicago manufacturer of resistance welding equipment went to the armed services. With defense production on the downgrade, the company turned its interest to civilian markets.

"We started our market research program by taking a look at ourselves in a mirror, so to speak," says Tom L. Lonergan, sales promotion and advertising manager. "We couldn't tell where we were heading if we didn't know where or what we were in the first place."

Company officials started by looking at their sales records and the dollar figures of the industry, which they figured on the basis of trade association sales estimates and government figures on shipments. From what they knew about their business and the future of resistance welding, they felt the potential should be many times those figures. Mr. Lonergan started collecting market facts to check this out.

From Penton's Continuing Census of the Metalworking Industry and Department of Commerce publications, he got five basic tools:

1. Number of metalworking plants in the U. S. that do resistance welding of some kind and have 20 or more employees. 2. Where those plants are. 3. What operations they perform. 4. Number of employees in those plants by size groupings. 5. Population growth and movements.

"As an example of how this thing works," Mr. Lonergan explains, "let's say that total sales in the U. S. are $40 million a year; there are 10,000 plants using resistance welding equipment. Maybe 5000 of them are in sales territory A, accounting for about half of sales. If we made all types of resistance welding equipment, our potential would be $20 million. We don't. Our historical sales record indicates we account for only X per cent of the industry's sales. By dividing total sales in territory A by our share of the market, we get maybe $12 million.

"We apply a correction factor based on things like our sales strength in the equipment used in the area. Once we have the potential, we can apply other factors, such as growth patterns, which we can determine from historical government and association figures. In the end, we have a logical pattern of potential based on facts and reasonable assumptions."

Market facts verified Sciaky's faith in its sales potential and served as a guide in realigning its sales force to cash in on it. "Knowing where these markets are, we have also been able to reduce the cost per sales call," declares Mr. Lonergan. "We are further using the information in improving our promotional campaign. On the basis of tangible results so far, we know the method pays off in greater sales."

MARKET FACTS

SIC: The Key to Government Data

THIS is how the Standard Industrial Classification plant coding system (SIC) works.

Each industry is assigned a two-digit code number—19 through 39 apply to manufacturing industries. Metalworking plants generally fall into six groups:

33—Primary metal industries
34—Fabricated metal products
35—Machinery (except electrical)
36—Electrical machinery
37—Transportation equipment
38—Instruments and related products

Other metalworking plants are in these groups:

19—Ordnance and accessories
25—Furniture and fixtures
39—Miscellaneous manufacturing industries

Basic numbers are subdivided into three and four-digit numbers, depending upon how much detail is wanted.

All departments of the federal government use SIC in the collection and presentation of statistical material.

Examples: Number of manufacturing plants in operation; value of products shipped; value added by manufacture; and employment in manufacturing industries.

You can use this system to simplify the collection and filing of your market facts. Classifications can be extended to cover almost any type information.

Source: *Standard Industrial Classification Manual*, Volume I, Part 1. Write: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price: $1.

on request. A complete list of these libraries can be obtained from your Commerce department field office.

Improvements Coming

"The information is too old, and it doesn't fit my problem," are the most frequent criticisms. This is particularly true of census data.

It is only fair to point out that no market information, even that developed from a company's records, is ever quite up to date. Those who have made most profitable use of this information admit it doesn't fit most problems to a T. But familiarity with the material will help in adapting certain benchmarks to your own operations.

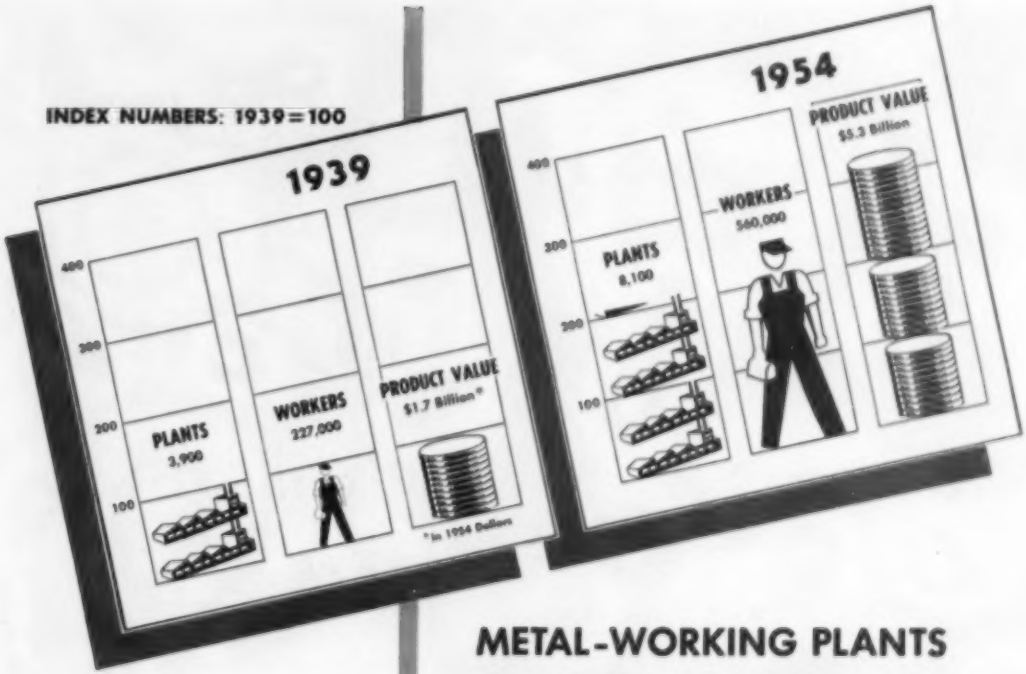
The National Industrial Conference Board has devoted one of its monthly executive reports to this problem. Among the 117 manufacturers participating in the study, many agreed that most of the government's material was too late to be of *optimum* use. But most of them reported that they would be handicapped without it.

Some of this difficulty is being overcome by modern methods of collection and tabulation. The government is using electronic brains for more speed. As a result the 1954 censuses of agriculture, business and manufactures should be ready in record time.

The American Marketing Association's study revealed that despite its deficiencies, government data are valuable for five reasons. First, accurate benchmark figures are necessary to maintain the accuracy of marketing research methods that involve sampling techniques. Only the censuses can supply these figures. Second, no other source is so comprehensive in geographic detail for so many types of information. Third, the objectivity with which the information is selected results in the most reliable data available. Fourth, the data are continuing and consistent, making the study of trends more reliable. Fifth, there is no restriction on the availability of any government census data.

The proper use of market information has many advantages. Most of them add up to reductions in marketing costs. The Office of Domestic Commerce booklet, *How Manufacturers Reduce Their Distribution Costs*, says that such reductions are the result of two related management tools for deciding and executing basic marketing policies: 1. Estimates of market potentials by territories, products and customer classes—they indicate where and how to apportion marketing efforts in closest relation to potential sales results. 2. Distribution cost analyses to locate the relatively unprofitable sales and the reasons for them—they permit study of ways and means to make these sales profitable.

It takes market facts to make both of those tools work. Putting it another way: "There's gold in them there facts."



METAL-WORKING PLANTS
MULTIPLY
IN NEW YORK STATE

New York State has more metal-working plants than any other state, and over the years they keep multiplying. In the past fifteen years, the State's metal-working establishments have more than doubled in number, while the value of their products (in constant dollars) *has more than tripled!* At the same time, workers in these industries have increased 140 per cent.

More industries . . . and a greater variety of industries . . . operate at a profit in New York State than in any other. This is true of thousands of metal-working plants. It can be true of yours.

Our Industrial Location Service is prepared to give you facts — professionally analyzed for your particular benefit — covering sites, raw materials, transportation, labor and power. Our booklet — "Industrial Location Services" — explains what we do and how you can use our knowledge. For your free copy write New York State Department of Commerce, Albany 7, New York.

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Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

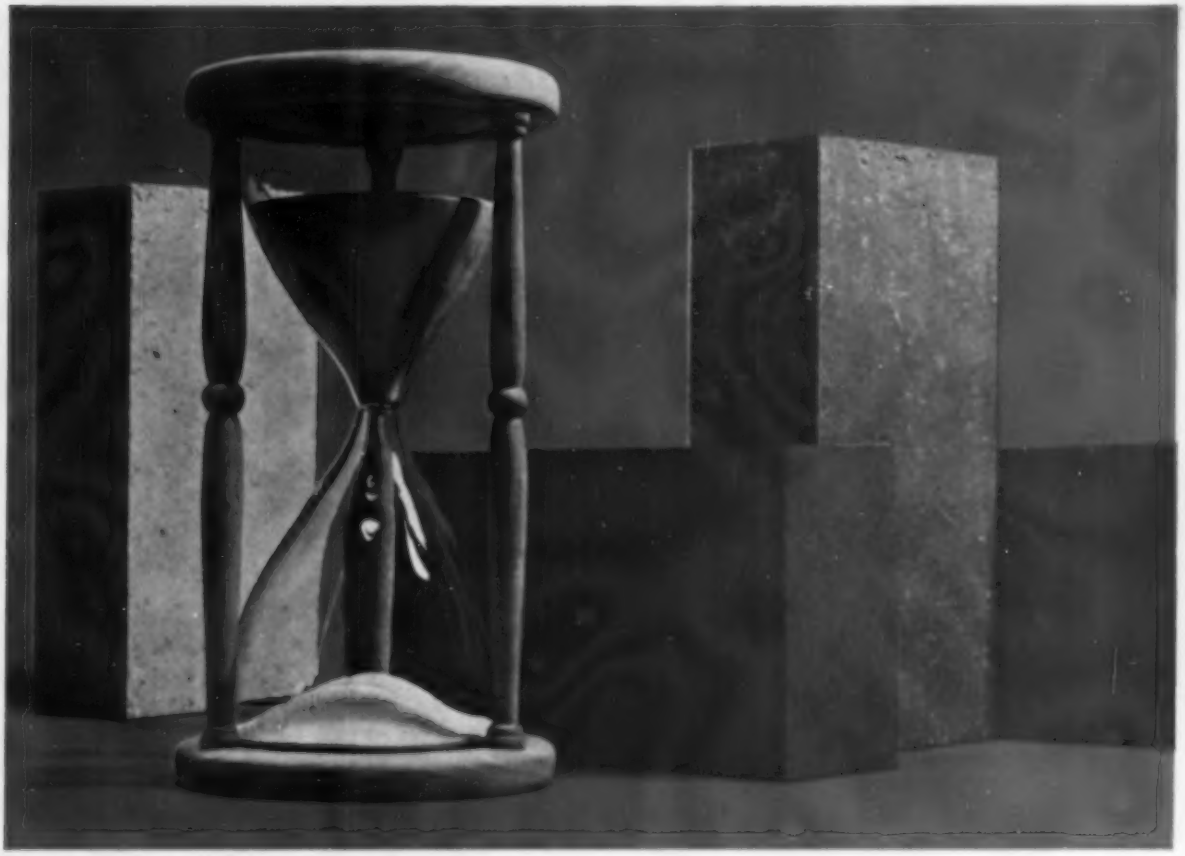
Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

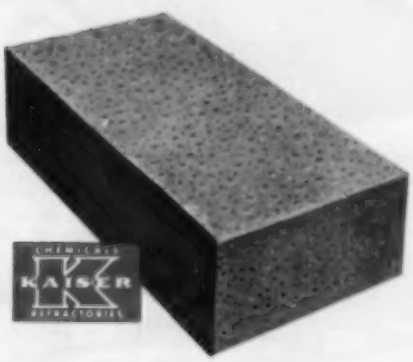
SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.



think of **Kaiser Chemicals**

Pioneers in Modern Basic Refractories



REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

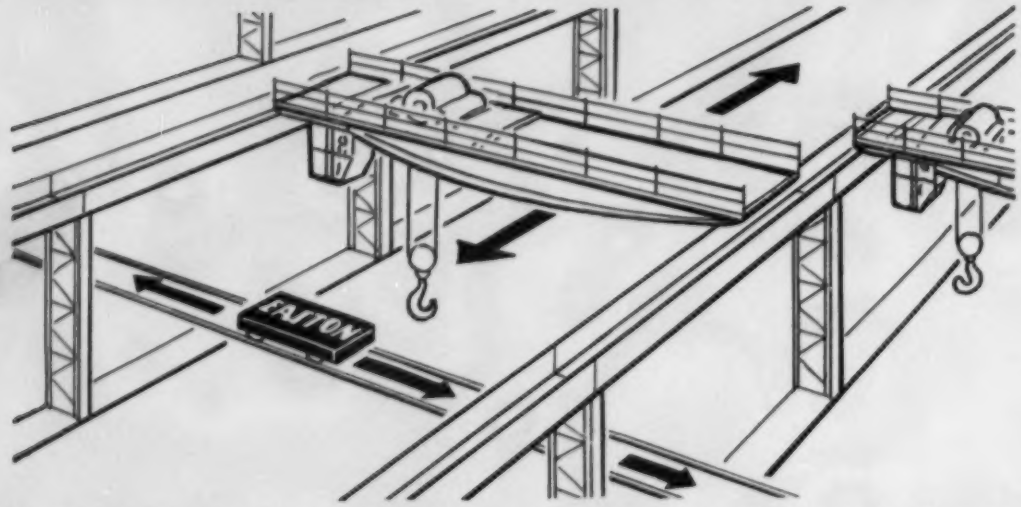
- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

Now available! **A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

USE YOUR IMAGINATION WITH

Cross-Bay® Transfer Cars



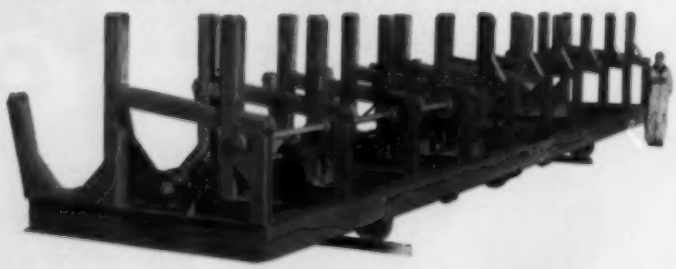
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

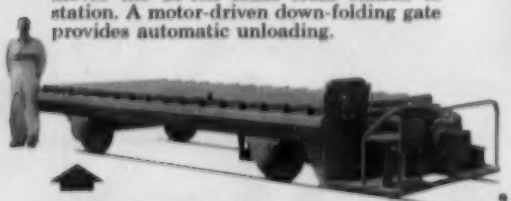
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

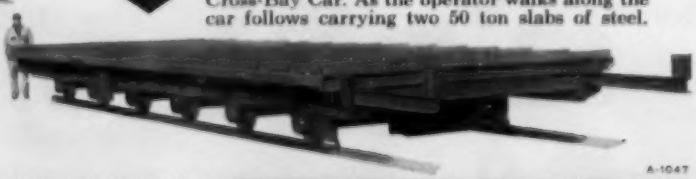
IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.



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OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

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Coal Charging Cars	Newsprint Cars	Skip Cars
Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
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October 24, 1955

Technical Outlook

LITHIUM BOOM—Impact of the lightest metal is being felt in all-weather greases (most automobile greases probably will contain it soon); in porcelain enamels (where it lowers the melting point of the frit); and in air conditioning (as a dehumidifier). American Potash & Chemical Corp. is boosting lithium production with the formation of a new company, American Lithium Chemicals Inc., and a $6.6-million plant near San Antonio, Tex.

AUTOMATED X-RAY—Mass chest x-ray techniques are ready for the production line. The method is photofluorography. X-rays produce an image on a fluorescent screen which can be photographed on small, low-cost film. Fluorescent screens sensitive to high voltage x-rays and a more sensitive camera make it possible to install the equipment astraddle a conveyor line. Developers of the method, Daniel Polansky and D. T. O'Connor, are winners of GE's Coolidge Award this year.

LOWER THE BETTER—Tensile properties of tantalum sheet and wire improve as the temperature drops. It can be used down to −100°F without impairment of mechanical qualities, a Bureau of Standards study shows. Nilvar, a nickel-base alloy used for telephone diaphragms, and beryllium-copper show good low temperature properties if the modulus of elasticity of Nilvar and the grain size of copper are controlled.

NITROGEN IS KEY—A new grade of austenitic stainless steel with special fields of application—not merely a substitute for present grades. That's the way Dr. D. J. Carney described a new chromium-manganese stainless containing little or no nickel at an American Iron and Steel Institute meeting in Cleveland. The discovery that proper adjustment of chromium and manganese gives sound ingots with a nitrogen content more than double previous limits is the key to the new steel. It was developed by U. S. Steel's South Works at Chicago.

IN VACUUM—Austenal Laboratories, New York, is installing a vacuum furnace designed for investment casting. It will permit use of a wider range of alloys and give some alloys being used greater strength and ductility.

HYDROGEN ENTRY—Formation of solid solutions or metal hydrides may be the mechanism of hydrogen entry into metals during pickling and plating. Dr. L. D. McGraw, of Battelle Memorial Institute, thinks that's a more likely avenue than absorption of atomic hydrogen, or the formation of molecular hydrogen which requires rifts or lattice defects in metals.

FOR THE FUTURE—U. S. Bureau of Mines, in co-operation with industry, will use its experimental blast furnace at Pittsburgh to take a look at operating problems. Smelting characteristics of iron ores will be investigated, using coke, anthracite coal and other fuels. Other questions up for study: The best sizing of ores and most desirable types of agglomerants.

QUIET PLEASE—GE has a library of noises recorded on tape. Typical items in the collection: The hum of motors and transformers. It's for use in their echoproof chamber, used for isolating and quieting noise sources.

Metalworking Outlook—p. 45 *Market Outlook—p. 135*

DON'T BE A "WILLIE WASTE" . . .

TAKE WHAT YOU NEED—

BUT USE WHAT YOU TAKE

IT'S AN APPROACH TO . . .

Saving Dollars in Manufacturing

By DR. ALLEN G. GRAY
Technical Editor

WILLIE WASTE is well known among the 2800 employees at Leeds & Northrup Co., Philadelphia. He's management's way of getting across a point: Reduce waste to cut manufacturing costs.

The plant publication carries the story of Willie in all issues. Posters and pamphlets alert employees to their responsibility in creating savings. Willie is a symbol. He jeopardizes job security, the company's competitive position and sales, individual and company earnings.

Objective of the program: Save 10 per cent of $1,235,000 production expenses, which will amount to $123,500 this year.

Concentrate Here—L & N management picked seven target areas (listed with their expenses):

1. Small perishable tools—$124,000
2. Small parts and materials—$241,000
3. Stationery, postage and printing—$245,000
4. General supplies—$278,000
5. Spoiled and defective work—$23,000
6. Light, power, fuel and water—$143,000
7. Telephone and telegraph—$180,000

Willie Waste was one of many cost cutting stories that came out at the first nationwide Industrial Conservation Seminar conducted by the Air Force's Air Materiel Command in St. Louis.

Some 500 executives and Air Force people gathered to swap ideas on conservation—how to save money in manufacturing.

Defense—Brig. Gen. Clyde H. Mitchell stated the Air Force case: "Conservation and cost reduction to get the most effective Air Force per dollar is essential."

One of the spokesmen for industry, George J. Dennis, assistant to vice president in charge of manufacturing, Sperry Gyroscope Co., said: "Our cost reduction program has saved us several million dollars during the last year or so. We are looking for even greater savings this year.

"For every dollar we save, we have an equivalent of $20 to $40 worth of sales dollars. We can lower our costs and our prices.

White cards next to metal samples tell workers at Heintz Mfg. Co., Philadelphia, what the metals they use cost

This sign holds down scrap in fabricating aircraft bay bomb doors at Aeronca Mfg. Co., Middletown, O.

This will attract business. In the manufacturing process it means lower work content in the different jobs. We can make greater use of our facilities. More jobs can be put through the shop."

One Area—Here are examples of Sperry's savings: "Last year," said Mr. Dennis, "we started a scrap and rework committee made up of foremen. Their job was simply stated: Reduce scrap and rework. This four-man group saved us $240,000 last year."

Most savings, according to Mr. Dennis, were accomplished by getting people to talk to each other. "Our organization is a large one, and as we grew, we lost touch. We were surprised at how many dollars could be found if we only stopped and talked for a while.

"We in administration at Sperry talk with engineering regularly on burring needs. It saved us 6400 hours last year," reported Mr. Dennis.

So called fixed cost areas (heat, light, power, etc.) also yield to cost cutting. The heating system and foundry at Sperry were converted from Bunker C oil to gas. It saved $20,000 a year.

Make it Work—What made the Sperry cost cutting program click? Mr. Dennis gave this advice:

1. Direction from the top side is the way to launch the program. The official stamp was given by the vice president and general manager.
2. Followup by top side is the way to keep interest at a peak. Each division head—a vice president—was responsible for keeping his part of the cost cutting program going. Co-ordinators were appointed and were responsible to the vice president.
3. Week-by-week publicity is the key to success. Individual publicity is important. The house organ was used and a monthly cost cutting

Eight Rules for Cutting Costs in Forming Titanium

Installed cost of titanium aircraft parts is about $200 a pound. The Air Force's immediate goal is to reduce it to $40. Air Materiel Command gives users of titanium these rules to follow for cheaper sheet fabrication.

1. Inspect and test incoming material and classify according to properties and degree of formability. This prevents scrap later.
2. Make careful nesting studies to get highest utilization. If possible, make layouts that will use mill size sheets.
3. Remove all notch effects from blank edges by filing and polishing to prevent stress risers.
4. Heat and form at 600 to 650° F. Stress relieve at 1000 to 1050° F.
5. Use creep forming in place of hand finishing where possible. It's slower, but will prevent use of hand torches and failures due to overheating.
6. Stress relieve before and after dimpling operations; inspect for notches that might cause cracks during riveting.
7. In stretch forming avoid excess work in a transverse direction. The spread between yield and ultimate strength is close in this direction.
8. Avoid assembly stresses and preloading by using close tolerance fixtures and parts in good alignment.

This machine shop worker at Northrop Aircraft Inc. was awarded $416 for an idea: A holding fixture and cutting bar to eliminate a grinding operation in making close tolerance bushings. Production was increased from 80 per day to 3000 per hour

Employees' Ideas Save Time, Material

Worker suggestions are an important part of a conservation and cost cutting program. The person doing a job often has a better idea of what's needed to improve it than anyone else.

Management at National Cash Register Co. (its suggestion system is 61 years old) says a good suggestion does any of these things: 1. Saves time or material. 2. Eliminates accident hazards. 3. Increases production. 4. Simplifies forms. 5. Improves quality and appearance of products.

In addition to recognition by management, a worker should receive a cash award for his suggestion—based on what it will save the company.

NCR pays 10 per cent of the gross savings for one year. Average award: $25 to $30. To stimulate suggestions, the company gives household merchandise, an additional 2 per cent award.

At General Electric Co.'s Cincinnati plant, over 1250 employee suggestions were accepted between January and June of this year. Cash awards were over $35,000. Potential savings: Over $190,000.

How To Conduct a Cost Cutting Suggestion Program

On Feb. 1 of this year, Philco Corp., Philadelphia, launched a three-month cost reduction suggestion campaign. By Apr. 30, over 3000 ideas and suggestions for cutting manufacturing costs were turned in.

The objective was to encourage all employees to give careful thought to ways of cutting costs on their jobs. Based on the slogan, "There's Always a Better Way," they were offered cash awards for suggestions on how to : 1. Reduce costs. 2. Eliminate waste of time or materials. 3. Conserve supplies and equipment. 4. Eliminate unnecessary paper work. 5. Increase production efficiency. 6. Improve quality of products. 7. Simplify procedures. 8. More effectively combine certain operations. 9. Eliminate mistakes.

To add interest, 100 cash awards of $10 were made each week for the best suggestions. From weekly winners, each month 30 were selected for an additional award of $50. After the campaign was finished, the ten best monthly winners were given a special award.

Publicity was emphasized. Posters and buttons were used. *Philco News* published pictures of winners each month.

Every suggestion submitted was carefully investigated by the evaluation committee in each department. Cost reduction value was the prime consideration.

Philco management was impressed with the high caliber of the suggestions. In a congratulatory letter to all employees, President J. H. Carmine added a note: "Although the campaign is over, I must remind you that cost reduction is not a 'one shot deal.' It demands the continuing attention of all of us. If we don't come up with the better method . . . the improved product . . . the savings in materials and supplies . . . we are leaving the door wide open for someone else who will."

letter (styled like Kiplinger's) was developed. It goes to all supervision in manufacturing.

Technical — There are many areas in engineering where cost cutting tools can be applied. Take the fast growing field of nondestructive testing.

Its application in quality control will save materials and labor. But it's important that the physical properties tested be correlated with performance of the material.

Here's the way Arthur L. Pace, applications engineer in General Electric's X-ray Dept. explained it at the Conservation Seminar: "The information gained in nondestructive testing must be used by each group responsible for the various phases of manufacturing."

What It Can Co—Nondestructive testing can: 1. Determine the physical property of a material without its destruction. 2. Indicate corrective manufacturing procedures. 3. Eliminate labor or defective units. 4. Separate unusable from usable material. 5. Promote maximum utilization of materials. 6. Assure stock of usable material through receiving inspection. 7. Give data on serviceability of parts through periodic inspection. 8. Aid in search for new materials.

Help Here—Nondestructive inspection is used to solve metallurgical mysteries that often pop up in production. In one case, machining of titanium forgings was damaging tools and causing loss of parts. The tungsten inclusions causing the trouble were found and identified by x-ray.

Quality Control—Don't overengineer quality control. There is such a thing as "overquality." The people who run the quality control department must be cost conscious as well as quality conscious.

This was some of the advice given on how to make quality control an effective cost cutting tool:

"After inheriting the quality control department, I was greatly concerned about the volume of skilled man-hours going into developing tools that would give 0.002 in. tolerance on inspection openings and similar insignificant characteristics on parts," said Paul E. Allen. He's manager of qual-

ity control and customer service at Beech Aircraft Corp.

"I was also concerned," he added, "about the volume of skilled material review inspection and liaison engineering man-hours expended in salvage processing of minor nonconforming parts.

Steps Taken—"As a result, we developed a program for classification of engineering characteristics. Our design engineers were asked to spell out on the drawings the critical, major, minor A and B characteristics of a part. The understanding was: Critical and major characteristics must be held as specified. Minor characteristics could vary within certain limits so long as the part made up into a satisfactory item."

Better Quality—Examined from a quality standpoint (based on a two-year study), it was found that parts had a higher quality. A more serviceable end product is turned out at lower cost.

Mr. Allen said: "The system greatly reduces the number of characteristics an inspector must check, so he can concentrate on the important points. Fewer consequential items have gotten by inspection on projects using this system than was the case before its adoption."

Robert A. Weinhardt, manager, fabrication methods, reported: "At Collins Radio Co., we make quality control a real control and not just a tight inspection group. It must find the source of waste and scrap and report back so that corrective action may be taken."

Three Points—Quality control is one area emphasized in Collins' three-point conservation program. Others: Design, manufacturing.

In design the points getting most attention are standardization, simplification and feed back of production information to design engineering.

In manufacturing, a variable overhead budget control at the operating level is used. It makes the foreman and superintendent aware of all manufacturing costs (including overhead items) and measures their effectiveness in these areas.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Why—The Questioning Attitude

Westinghouse Electric Co. uses a manual of 261 *why* questions as a cost reduction tool in its 28 plants.

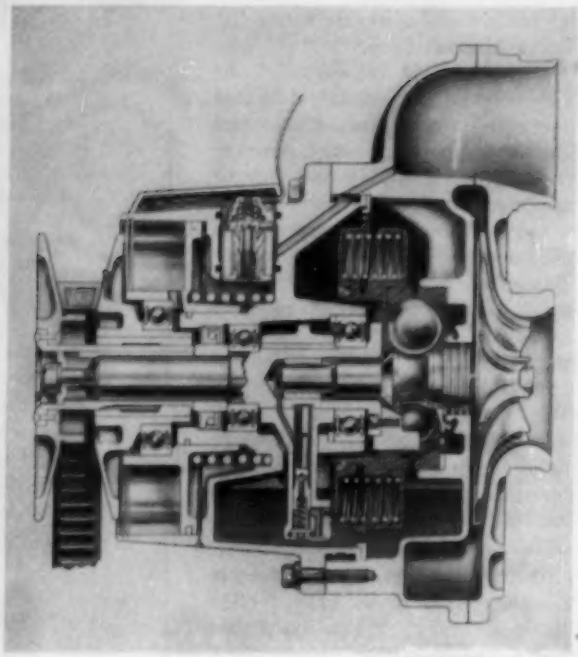
A person who has developed the questioning attitude, says Westinghouse, takes nothing for granted. He questions reasons behind everything connected with the operation.

Questions in the manual cover these areas: 1. Purpose of operation. 2. Analysis of process. 3. Inspection requirements. 4. Material handling. 5. Design. 6. Setup, tools, fixtures and machine equipment. 7. Material (below). 8. Working conditions.

33 Why's To Probe Cost Reduction in Material

1. Does the material specified appear suitable for the purpose?
2. Could a less expensive material be used that would function as well?
3. Could a lighter gage material be used?
4. Is the material furnished in suitable condition for use?
5. Could the supplier perform additional work upon the material that would make it better suited for its use?
6. If a casting or forging, is excess stock sufficient for machining but not excessive?
7. Can the machinability of the material be improved by heat treatment or in other ways?
8. Are castings clean, and are fins, gate ends, etc., removed?
9. Is material sufficiently clean and free from rust?
10. If coated with a preserving compound, does it affect dies?
11. Is material ordered in amounts and sizes so it's utilized with minimum waste, scrap, or short ends?
12. Is material utilized to the best advantage during processing?
13. Is miscellaneous material used for assembly suitable, such as nails, screws, wire, solder, rivets, paste and washers?
14. Are supply materials, such as cutting oil, molding sand or lubricants, best suited to the job?
15. Are materials used with the process—gas, oil, coal, air, water, electricity, acids and paints—suitable? Is their use controlled and economical?
16. How does cost of material compare with value of the labor?
17. If a more expensive material which was easier to machine was substituted, would there be a saving?
18. Could parting of patterns be changed to eliminate machining?
19. Could molded or cast parts be substituted to eliminate machining?
20. Can design be changed to eliminate scrap material?
21. Can the number of materials used be reduced through standardization?
22. Could the part be made from scrap material?
23. Can newly developed materials be used?
24. Are provisions available for segregation of different material cuttings and short ends to assure maximum return?
25. Is the supplier furnishing material on which he has performed an operation not necessary for our use?
26. If the material is obtainable with reasonable tolerances and surface finish, can we specify a stock size to eliminate a machining operation?
27. Can extruded material be used?
28. Will better control give a more consistent grade of material?
29. Can a fabricated part be used instead of a casting on low activity jobs to save pattern costs?
30. Is a minimum number of hardware sizes used on any given job?
31. Is the supplier doing assembly on a part which we later dismantle?
32. Is material free from burrs and sharp edges?
33. What effect does storage have on material?

This bearing for an automotive supercharger has five large balls, a split outer race and a fixed ball holder. In operation, it acts as a speed changer



McCullough Motors Corp.

Cross section of the supercharger shows the bearing (right) and the springs which force the split outer race together to produce driving friction

Case for Special Bearings

HERE are several ideas on the use of special antifriction bearings.

Consider the unground bearing. It can be used at far lower cost than one incorporating ground races. In some applications, the unground one will do a better job.

Benefit—Its looser construction makes it valuable where it is difficult to exclude dirt. Tiny particles getting into a precision bearing will cause it to bind. The same amount of dirt will have no ill effect on an unground bearing.

Some of these bearings have bevel gears on one side, combining a bearing and gear function. Some are made with their inner races split to allow placing more balls in them. Sometimes they have extended inner races which may be drilled for pin or setscrew to lock the bearing on a shaft.

Screw Machine Radials—Bearings are made with solid inner races which can be bored and broached for mounting on square or irregular shafts. They are sometimes called screw machine radials because most of the parts are produced from bar stock on automatic screw machines.

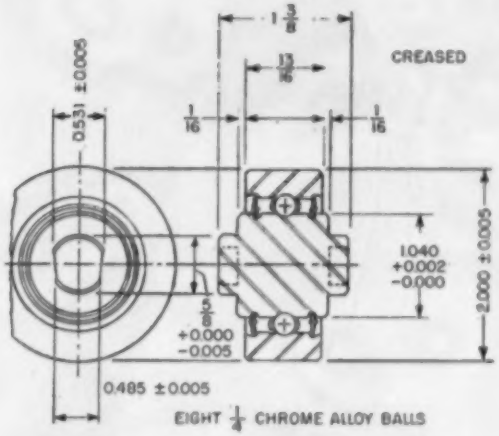
Combining the looser construction of unground bearings and the irregular mounts, these radials are used advantageously in many products.

Cam Followers—A manufacturer of textile machinery uses treadle roll bearings which act as cam followers. Most applications of this type are roller bearings. Some are built to specifications; some are mounted on standard studs; and some special guide rollers are mounted on threaded studs.

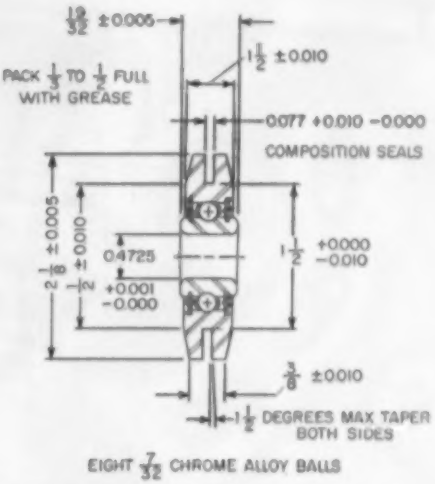
This type roller bearing is used on wire casting equipment; the outer races are grooved to required wire size. It also is used for steady-rest rollers on lathes.

Special Races — In some instances, the inner or outer bearing race varies radically from standard design. This is true of rubber-tired bearings used on aircraft windshield wipers (illustrated). It also is true of roller bearings designed for venetian blind cords. The outer race on one ball bearing is used as a chainsaw guide roller. This race is thick and deeply grooved.

Special ball bearing collars often are mounted on the rotary



This ball-bearing treadle roll is used as a cam follower on a textile loom. Such applications usually employ roller bearings

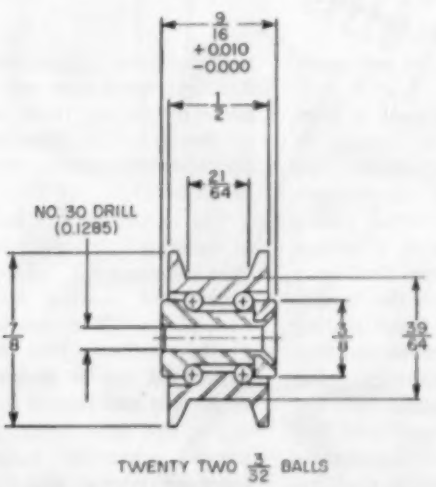


Rollers used at the outboard end of a chain-saw have a groove 5/16-in. deep in the outer race to guide the saw blade

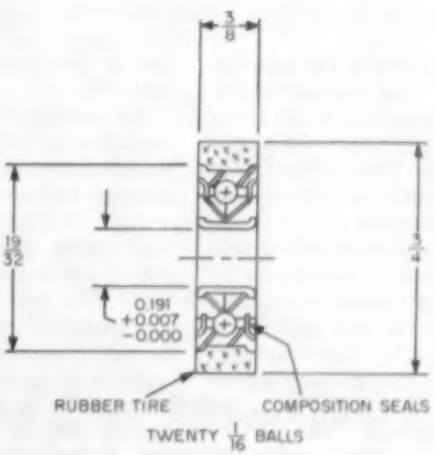
spindles of woodworking shapers. When cutting irregular contours, the shaping cut is gaged directly from the collar. The inner race of the bearing collar is thicker and has V-grooves in which the edge of the cutter is clamped. The outer race is free to revolve independent of the inner race and spindle.

Speed Changer—An unusual use of ball bearings is found in an automotive supercharger. This bearing carries radial and thrust loads and acts as a speed changer.

Large-diameter balls are used with a fixed holder to keep them properly spaced. The outer race is split. Springs force the two halves together to produce enough friction on the ball-contact surfaces to drive by traction. Power applied to the ball separator forces the balls to roll against the stationary race and drive the inner race. This gives a 4.4 speed step-up. This bearing is made by New Departure Division, General Motors Corp., for McCullough Motors Corp., Los Angeles.

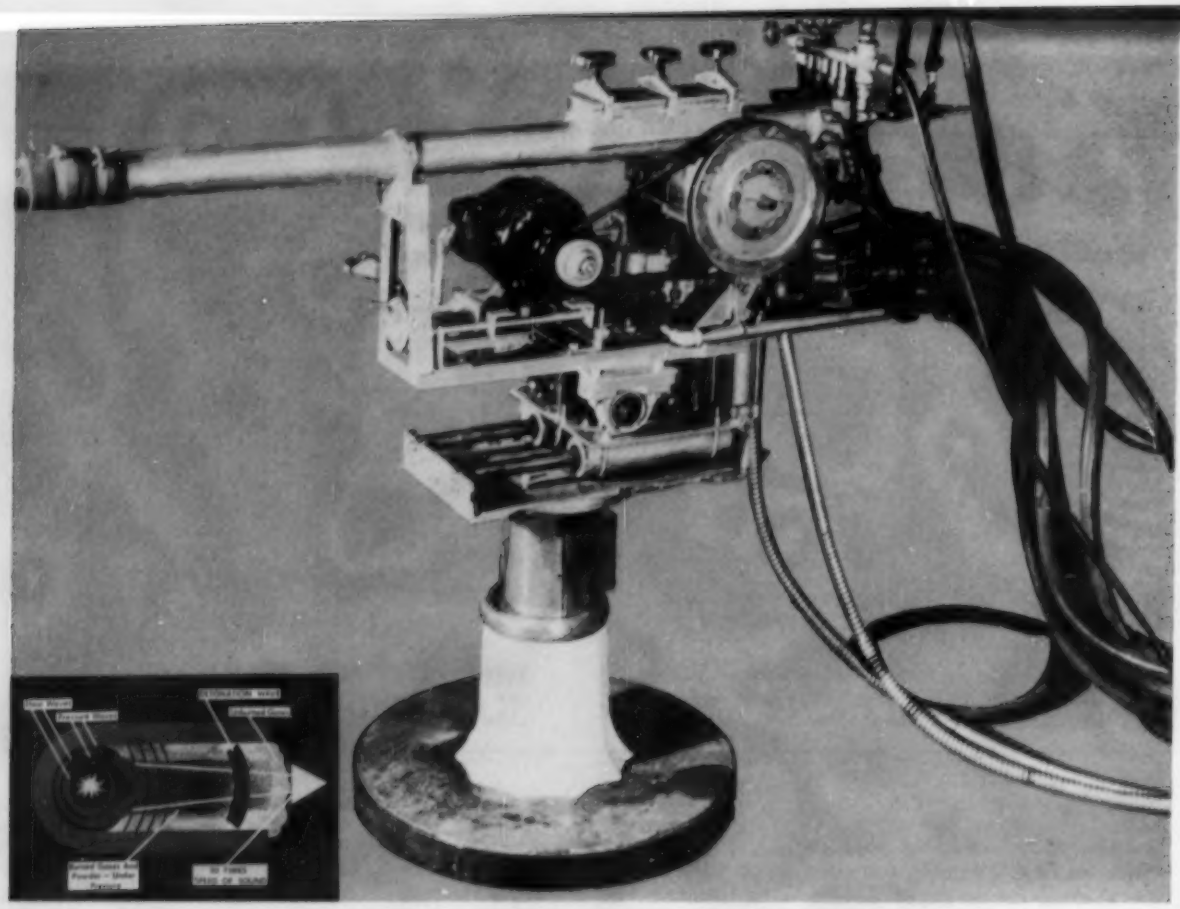


The central member of a roller for venetian blind cords has a thin projecting lip which, after assembly, is spun back against a beveled washer



On a rubber-tired roller for an aircraft windshield wiper, the two-part, split inner race is held together with a pressed steel sleeve

Nice Ball Bearing Co.



Flame plating gun. What looks like the barrel is really a water jacket surrounding the barrel. Detonation, the principle behind flame plating, is so noisy it must be conducted in a soundproof room by remote control

Ready, Aim, Plate

FLAME PLATING is the name it goes by, but "blast coating" might be more accurate. Linde Air Products Co. has just taken the wraps off the process. The tool that does the plating turns out to be first cousin to a machine gun.

Molten gobs of tungsten carbide are blasted from a gun barrel by detonation of tungsten carbide powder, acetylene and oxygen ignited by a spark. The sharp explosion hurls the carbide at its target, only 3 or 4 in. from the muzzle, at 9000 fps.

Sounds Noisy—Firing at 4 cycles a second, the flame plater is about as quiet as an antiaircraft gun, so Linde operates it in a soundproof room. The operator maneuvers gun and part to be coated by remote control. Oxygen, acetylene and carbide powder are fed automatically.

An ordinary gun uses a slow explosion to propel its charge. In detonation, the heat wave rips through and precedes the pressure wave. This effect is what expels the carbide particles in a molten state and keeps them that way until they impinge on the target.

Targets—Uses of flame plating include tungsten carbide coatings applied to gages, bushings, wire-forming mandrels, anvil blocks opposing cutters in cardboard box machinery, rubber skiving knives and similar applications that require an extremely wear-resistant surface.

The coating consists of tightly interlocked flakes of a tungsten-carbon-cobalt complex (the mixture contains 8 per cent cobalt). A single detonation will deposit a layer 0.0005 in. thick on a steel surface 1 in. in diameter. Metals, ceramics and organic materials can be coated.

The nature of the bond is still in question. It seems to be more than mechanical, although base metal and coating do not mix chemically. The coating has a grainy surface, like fine emery paper, but can be diamond ground to 20 rms and lapped to 2 rms.

For the time being, Linde will handle whatever flame plating business comes along. Although only tungsten carbide coating is being done commercially, the gun has shown possibilities for producing other coatings of both high and low melting points.

HOW CMP RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL CUTS MATERIAL AND END-PRODUCT COSTS . . .

Putting a stop to troubles with cold rolled strip steel has long been the specialized business of CMP.

By working to restricted specifications for size, characteristics and finish, CMP precision rolling and processing has helped in many ways to reduce slow downs in production with flat rolled steel.

The danger of not having steel with the "working qualities" that will keep up with todays high speed automatic machines can be eliminated. In many cases a CMP restricted specification strip has simplified tooling and stepped up machine speeds 25% or more.

And when the free flow of CMP strip is moving through your equipment without difficulty you'll know why your end-product costs are at the right level — why it pays to always check CMP for the right specification wherever cold rolled strip steel is needed. Your inquiry is invited.

CMP WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

- LOW CARBON
- HIGH CARBON
- Annealed or Tempered
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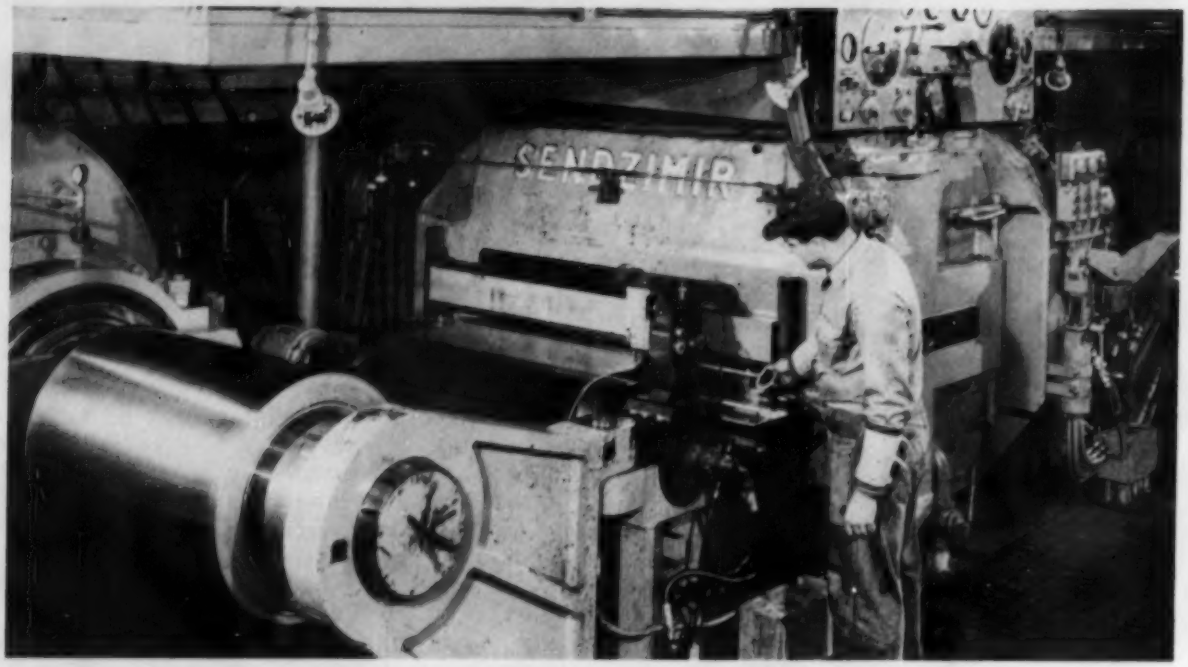


Now in production, Republic's new Sendzimir mill means . . .

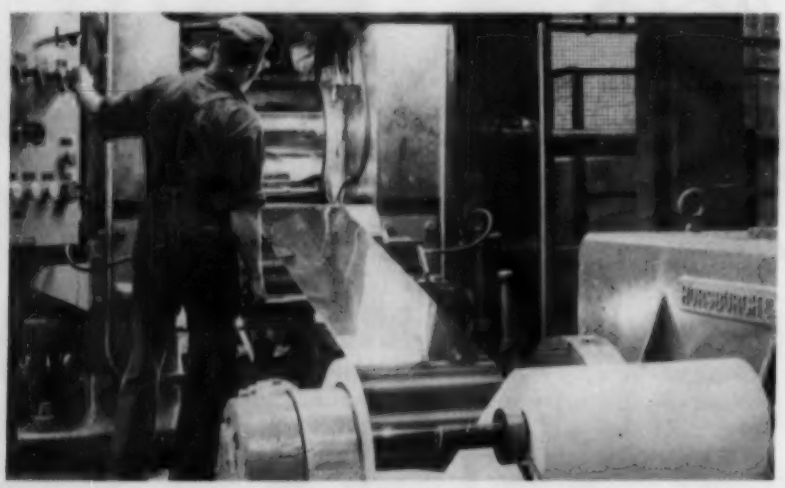
More Facilities for Stainless

A NEW SENDZIMIR mill at Republic Steel Corp.'s Massillon, O., plant is cold rolling 713 ft of 48-in. wide stainless sheet a minute.

The mill is part of the just-completed program to expand stainless steel cold rolling and finishing capacity by about 25,000 tons annually.

Can Meet Demand—"Our new stainless facilities have come into production in time to alleviate a shortage in the country's stainless steel supply," says Clyde E. Roberts, Republic's manager of alloy division sales.

"In recent months we have had difficulty in keeping up with orders for flat-rolled stainless steel products. The new equipment will enable Republic to meet anticipated demand for stainless sheet and strip," he explains.



Stainless comes from this 26-in. temper mill with a smooth, hard finish. Paper is wound onto the coil of steel to prevent scratching in shipping and handling

Alloy Steel Producer—Stainless steels for the Massillon cold-rolling mills are made at the company's Canton (O.) steel plant, where Republic has 17 electric furnaces. The Massillon and Canton plants comprise Republic's Central Alloy District. These plants specialize in stainless and alloy steels.

The new Sendzimir mill is the tenth to be installed in the United States exclusively for the cold reduction of stainless steels. The company purchased one of the first Sendzimir mills in the country for its stainless steel plant in 1949. Its maximum rolling width is 25 in.

Accurate—The design feature of

Copper process now cuts two plating expenses

♦ Buffing costs reduced by special deposits from plating process developed and improved by United Chromium

♦ Non-cyanide Unichrome Pyrophosphate Copper Solution also avoids costly waste disposal problem

Where there's bright chromium finishing, there's bound to be polishing. Either the base metal gets it . . . or the underlying copper or nickel plate. With Unichrome Copper, the job done in the plating tank cuts costs at the polishing wheel.

EASIER BUFFING — OR NONE AT ALL

For finishing steel products, for example, Unichrome Copper can provide a satin finish ideal for buffing. It "flows" under the wheel, covering scratch marks, buffing to high luster in a flash. Rather than buff steel, it's generally far easier and cheaper to buff this copper.

For finishing die castings, a lustrous deposit can be produced that needs no buffing at all. By switching to Unichrome Copper, one plant finishing auto parts plated copper so lustrous, it eliminated 90% of buffing which *formerly* had to be done on the subsequent nickel.

NO CYANIDE WASTES

Unichrome Copper solution contains no cyanide . . . needs no costly waste treatment. To many plants, this is the deciding advantage. As one typical user put it, ". . . pyrophosphate copper solution was selected because it does not present a serious waste disposal problem."

This is just one of many United Chromium developments in processes, equipment and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

UNICHROME

METALLIC and ORGANIC FINISHES...EQUIPMENT

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Goodbye to old quench and temper methods!

SEE HOW

Martempering & Austempering CUT COSTS

FOR THESE LEADING MANUFACTURERS!

Shown here are typical examples of important production savings made possible by Ajax Electric Salt Bath martempering and austempering. And there are hundreds more!

Here, briefly, are the reasons for the outstanding superiority of this method: *First cost of equipment is only 1/2 to 1/5 that of any other conventional system!* Distortion is so negligible that parts can usually be finish machined *before* hardening. Final grinding is seldom necessary. Scale, decarb and quench cracks are avoided. Ductility is increased.

WRITE FOR TECHNICAL BULLETIN #500, *"The Present Status of Austempering and Martempering" — also list of documented case histories of martempering and austempering installations covering a wide variety of industries.*

$50,000 Saved ANNUALLY!

Austempering this well-known electric shaver head (0.003" thick) in an Ajax furnace scored a $50,000 a year saving over conventional quench and temper methods! Austempering produced tougher heads. Rejects due to cracks were reduced from 3.6% to .05%. Uniform hardness is obtained. Distortion is easily held within specified limits.

Grinding TIME Cut 80%

Martempered in Ajax furnaces and drawn to Rc 62-63, these SAE-52100 bearing races show an average out-of-round distortion of only 0.002-0.003" in heat treating. Grinding time was reduced from 50 minutes to less than 10 minutes per race.

One Man HANDLES ENTIRE Production

Lawn mower blades (SAE-1065) are austempered in a fully mechanized Ajax salt bath line to produce the critical combination of Rc 48-52 PLUS high ductility. Finished blades can be bent to horseshoe shape without cracking . . . and they're tough enough to cut nails! Production is 550 blades an hour. One man handles the entire job!

Zero Cracks AND Higher Rc

Section size of this high alloy valve plate varies from ½" to 1⅝". Conventional oil quench and temper methods failed to produce Rc 58-60 without cracking. Martempering and drawing in Ajax salt baths produced a hardness of Rc 60-64 . . . WITHOUT CRACKS!

AJAX MULTGREN **electric SALT BATH furnaces**

AJAX ELECTRIC COMPANY 952 Frankford Ave., Philadelphia 23, Pa.

Associated Companies: Ajax Electric Furnace Corp. • Ajax Electrothermic Corp. • Ajax Engineering Corp.

the Sendzimir mill that makes possible its accuracy in rolling a uniformly flat product is the pyramid cluster of drive, intermediate and back-up rolls by which tremendous pressures are evenly distributed throughout the length of each work roll.

The four back-up rolls at the base of each pyramid of rolls are supported by bearings placed at intervals throughout their length. The working load is supported by the mill frame from 20 widely distributed points above and 20 points below the work rolls.

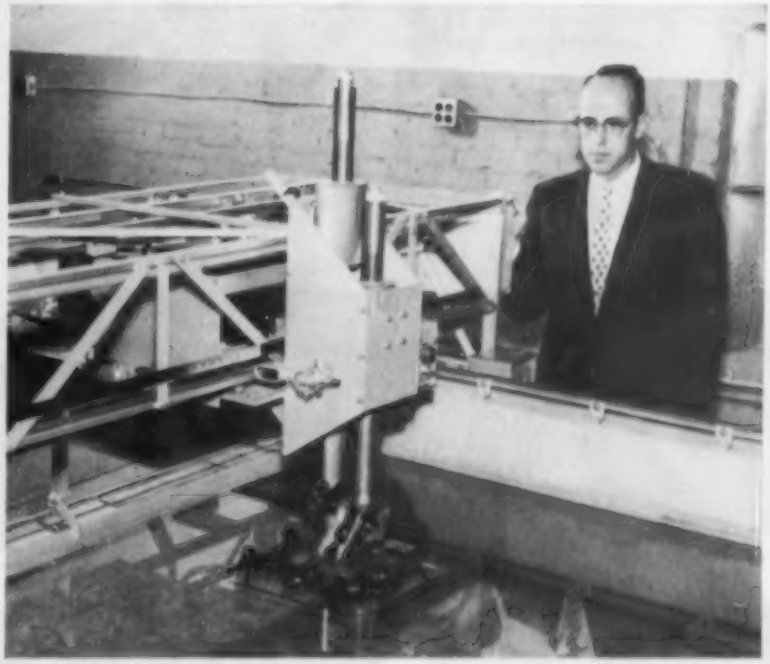
In contrast, the conventional 4-high mill is supported by the frame only at the four main bearings at the ends of the rolls. The rolls exert pressure in only the perpendicular plane.

Other Facilities—Also included among the new Massillon facilities is a 26-in., 2-high temper mill. This mill gives a fine surface to the steel and imparts certain desirable physical properties for fabricating.

Process, finishing, maintenance and handling equipment installed include annealing and pickling lines, inspection benches, overhead cranes, a single strand cut-up line, resquaring shears, roll grinders, a scrap baler, scales and welding, carpentry and materials handling equipment.

The new facilities are housed largely in buildings built previously, although some minor alterations and some relocation of equipment was necessary.

Workman changes work roll on Sendzimir mill. Pyramid clusters of drive, intermediate and backup rolls exert tremendous pressure on steel sheet



Unique manipulator holds crystal for Kaiser Aluminum's new...

Ultrasonic Flaw Detector

KAISER ALUMINUM & Chemical Corp. will use ultrasonics to spot flaws in aluminum plate for aircraft.

Designed and built by Electro Circuits Inc., Pasadena, Calif., the immersion unit cost $130,000 and will be installed in Kaiser's Trentwood (Wash.) rolling mill.

World's Largest — Fully automatic, the 50-ft long device has a maximum scanning speed of 18 in. per second. It can handle aluminum plates 48 ft long, 10 ft wide and 20 in. thick. A complete inspection takes about an hour and can uncover flaws as small as 1/64-in. diameter.

High Frequency—Sound waves transmitted by the device range from 2¼ to 25 megacycles. They will not travel in air, so water is used as a coupling device to conduct sound from the detector crystal into metal.

The unit has three basic parts: A crystal through which sound waves are transmitted and received, an electrically operated manipulator arm which can rotate the crystal in any direction and a 50-ft long water tank in which plates are immersed. A control pulpit is near the tank. It contains manual and automatic controls, alarms and two screens for visual flaw measurement. Parallel manual controls for the scanning mechanisms are at the tank.

The detector gives two separate interpretations. One appears on the "A-scan" whose radar type pips show a picture of echoes. By calibration it gives accurate size and depth of a defect. The other screen is a "B-scan." This scope is similar to a TV tube and shows the cross section of the defect's shape.

Complete Coverage—The manipulator is suspended from a carriage mounted on a bridge. The bridge travels the length of the tank as the carriage moves across it. This means 100 per cent of the plate can be scanned on a grid square system.

Bells Ring—A flaw in the plate stops impulses to the crystal; a bell rings, a light flashes and the location of the defect is automatically marked on the plate by a crayon. The operator shifts to manual control to determine exact size and shape of the flaw.

Research-Cottrell makes both

The choice of a straight precipitator or a combination mechanical-electrical precipitator for fly ash recovery depends on many factors—size and composition of the fly ash, efficiency desired, space available for the equipment, initial cost, etc.

Whatever your fly ash problem you can be sure of unbiased recommendations from Research-Cottrell, because we offer both types—and have done so for many years.

The cutaway drawings on the next page show several design features of both the straight Cottrell precipitator and the combination mechanical-electrical precipitator offered by Research-Cottrell.

These basic designs, as well as Research-Cottrell's custom engineering of each installation, are backed by over 40 years experience and over 500 fly ash collectors. For more details on this equipment write for Bulletins GB and FA.

Precipitator is designed and constructed for many years of heavy-duty, all-weather service.

RESEARCH-COTTRELL, INC.

A Wholly Owned Subsidiary of Research Corporation

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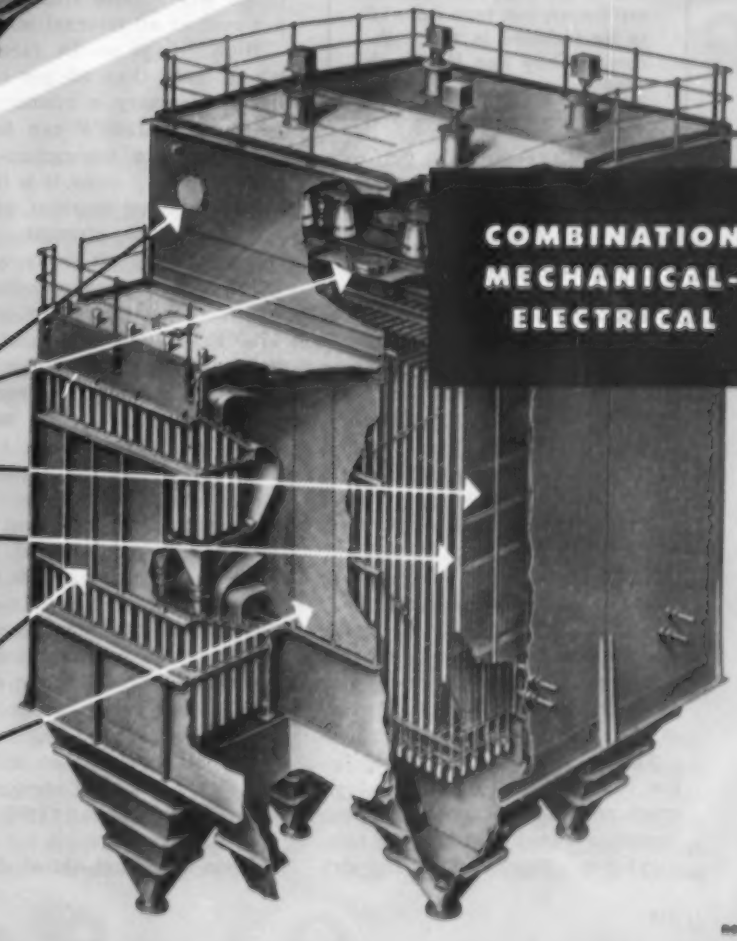
2. Hook-type collecting electrode hangers, quickly installed, insure uniform distribution of rapper vibration throughout entire collecting surface.
3. Rapping puffs prevented by automatic and continuous cleaning of collecting electrodes with Magnetic Impulse Rapper (patents pending).
4. Plumb-bob discharge electrodes are individually weighted and positioned by a steadying frame for maximum efficiency.
5. Hopper baffle prevents gas sneakage around electrodes.



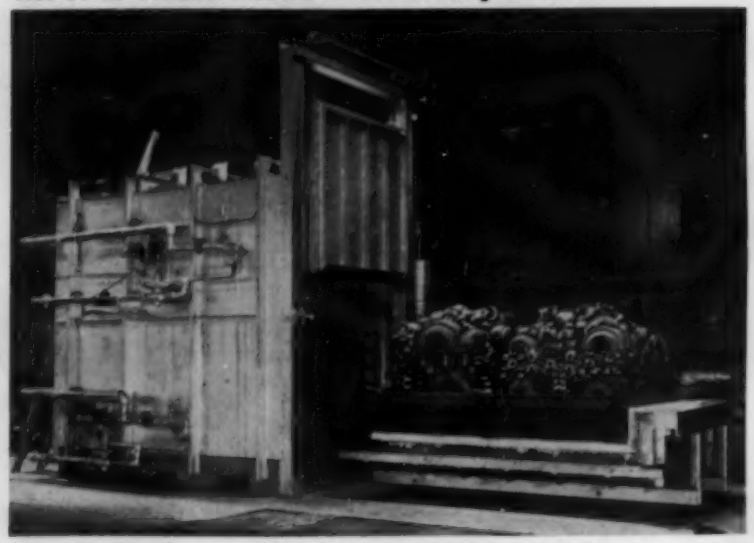
COMBINATION MECHANICAL-ELECTRICAL

6. Easy access to high tension equipment.
7. No moving parts in gas stream—minimizes maintenance.
8. End and intermediate baffles provide quiescent zones and prevent re-entrainment of collected dust.
9. Compact double-deck mechanical collector (patented) provides large capacity in a small area.
10. Double-deck mechanical collector design insures even gas distribution at precipitator inlet.

No. 19 in STEEL's Modern Heat Treating Series

Heat Treating Gray Iron

PART I



Prepared with the co-operation of the Gray Iron Founders' Society Inc. from material to be included in the forthcoming Gray Iron Handbook

WHEN USERS specify performance that "as-cast" irons cannot meet, heat treatment often holds the answer. It can remove stresses, improve machinability and develop high hardness for wear resistance or high strength to resist excessive loads.

This article will describe stress relief and annealing. In succeeding weeks flame and induction hardening (Part II) and through hardening and hot quenching (Part III) will be discussed.

Stress Relief—Residual stresses in castings may seriously lower their efficiency. Even in gray iron, stress relief by some form of heat treatment is frequently essential. The problem is to select a temperature range that will give the greatest relief with the least alteration of strength or hardness.

The amount of stress relief below 750°F is small due to the high creep resistance of gray iron, but increases rapidly at higher temperatures. Maximum relief, with least chance for decomposition of combined carbon, is in the 950-1050°F range. One hour in this range will remove from 60 to 80 per cent of all internal stresses.

High Range — In rare cases, where more than 80 per cent relief is necessary, a minimum temperature of 1100°F can be used, but except in low-carbon-equivalent, high-duty irons, it is likely to result in some sacrifice of hardness and tensile strength.

Low-alloy gray irons also require higher stress-relieving temperatures of the order of 1050-1200°F. Alloying elements, such as chromium, molybdenum, nickel and vanadium tend to increase the resistance of gray iron to creep. The obvious remedy is to moderately increase the stress relief temperature.

Common Practice—Most foundries use temperatures of 1000 to 1100°F, which are within the recommended range for plain and low alloy irons. Lower temperatures are sometimes used where the stress relief needed is not so great or facilities for slow cooling are not available.

For high-alloy irons, still higher stress relieving temperatures may be necessary (1100-1250°F, depending on type).

Time Important—Most stress relief takes place during the first hour after the casting reaches relief temperature; as the temperature goes up, the time required goes down. Usually it is impractical to use low temperatures and long holding times.

If the casting is allowed to cool rapidly to room temperature after stresses have been relieved, new stresses may be set up. Slow cooling is essential.

Cooling Rate—Parts should be furnace cooled at least to 550°F before being allowed to air cool. With castings of intricate design, it may be advisable to continue furnace cooling to 200°F. Most commercial furnaces cool down slowly enough.

ASTM specification A278-49T covering gray iron castings for pressure-containing parts for temperatures up to 650°F requires: After stress relieving, the cooling rate "shall not be more than 400°F per hour, divided by the maximum thickness in inches for thicker castings." This is satisfactory for most castings.

Weathering — Some foundries leave castings for several months in the open or in storage to relieve internal stress. Tests show that 10 per cent relief is the best that can be attained by this process. It hardly justifies tying up

a large investment in castings.

Temperature oscillations were thought responsible for stress relief during weathering. They turn out to have only a negligible effect. The supposed easier machinability after weathering can be laid to rusting. Red rust, even heavily loaded with sand, is easy to cut away.

Annealing—Gray iron castings are annealed to improve machinability, but this often results in some decrease in strength and hardness. An incidental, though frequently desirable, result of the process is internal stress relief.

Even without annealing, gray iron is more machinable than most other ferrous materials. But a completely annealed iron was found to be 50 times as machinable as an unannealed iron at a cutting speed of 300 fpm, and eight times at a cutting speed of 1100 fpm. In addition, power required was reduced one-half to two-thirds of that required before annealing. On one job involving the machining of 2000 castings a day, annealing saved $1500 a week on cutter grinding.

Structure Holds Answer—Gray iron contains larger percentages of carbon than any other ferrous material. It is normally present in two forms: 1. Graphite (free carbon) which gives gray iron some of its most advantageous characteristics, including superior machinability. 2. Carbon in a combined form as cementite (Fe_3C). It, in turn, is found in two forms—massive, hard crystals of cementite (typical of mottled and chilled or white iron) and pearlite, found in most gray irons.

The most easily machined gray irons consist entirely of ferrite and graphite. Even 5 per cent of free cementite has a noticeably bad effect on machinability. The purpose of annealing is to break down or separate the iron carbide, whether as pearlite or free cementite, into its component elements—ferrite and graphite.

Temperatures — Given enough time, some pearlite will decompose at temperatures as low as 750°F. However, up to about 1150°F the effect on structure is insignificant in normal gray iron. Above that, the rate of pearlitic decomposition to ferrite-plus-graphite increases sharply, reaching a maximum in the critical range (in the neighborhood of 1400°F for unalloyed or low-alloy gray irons).

Three temperature ranges are common: The low-temperature anneal, the medium anneal and the high-temperature anneal for the elimination of massive free cementite. The usual heat treatment for stress relief is considerably lower than for annealing.

Low-Temperature Anneal—This anneal is used where the only result desired is to spheroidize the pearlite or convert it to ferrite and graphite. For improved machinability, it is generally unnecessary to heat unalloyed or low alloy castings above the critical. In fact, heating to higher temperatures may hurt the annealing process, since the graphite will begin to go back into solution in the iron.

A low annealing temperature between 1300 and 1400°F is recommended. Where only maximum machinability is desired, the safest procedure is to choose the temperature that yields the lowest final hardness. Even dead soft gray iron machines freely.

Holding Time—The time during which the casting is held to temperature must be long enough to let graphitizing go to completion. Below 1300°F, the holding time should be about 1 hour per inch of cross section; in the range 1300 to 1400°F, the time is sometimes cut to 45 minutes. For an unusually slow rate of cooling, time at temperature may be cut even further.

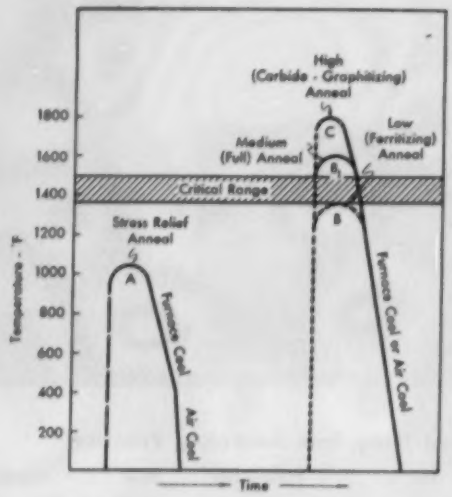
Slow cooling is best for capitalizing on the stress relief which automatically occurs as the casting cools through the lower ranges.

Medium Anneal—Many foundries use a medium or "full" anneal

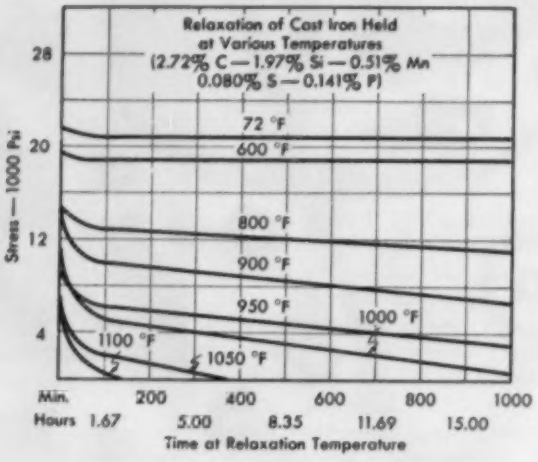
Recommended Gray Iron Annealing Practice

Type of Anneal	Use	Temperature	Time	Cooling Rate
Low temperature	For breakdown of pearlite to ferrite and graphite in plain and low alloy irons for maximum machinability	1300°F to 1400°F	45 minutes to 1 hour per inch of cross section	Furnace cool 100°F per hour between 1000 and 550°F
Medium temperature	For same purpose as low temperature anneal, but for alloy irons and those not responsive to low temperature	1450°F to 1650°F	About 45 minutes per inch of cross section	Furnace cool from annealing temperature to 550°F
High temperature	Elimination of massive carbides in mottled or chilled iron for retaining maximum strength and hardness	1650°F to 1750°F	1 to 3 hours plus 1 hour per inch of section size*	Air cool to 1000°F; then furnace cool to 550°F
"	For maximum machinability of mottled or chilled iron	same	same	Furnace cool from annealing temperature to 550°F

*Carbides may often be eliminated in shorter times



Recommended stress relief and annealing cycles for gray iron



Effect of time at stress relief temperature on initial stress

at temperatures between 1450 and 1650°F. Presumably, it is used where the low-temperature anneal has proved insufficient because of alloy in the iron.

Holding times are comparable to the low-temperature anneal. The casting must cool slowly through the critical range of 1450-1250°F or carbon may separate out as pearlite.

Many are using a medium anneal where a low temperature anneal would be sufficient or preferable. Such practice traces back to annealing practice for steel and has no reference to gray iron. It is good practice to try temperatures at or below 1400°F before adopting higher ones.

High-Temperature Anneal — If the combined carbon is present in the form of massive cementite, as in mottled or white iron, more drastic treatment is necessary. The process may simply have the purpose of converting free cementite to pearlite-graphite, although in some cases the object may be to carry decomposition all the way to pure ferrite-graphite.

Free carbide that must later be removed by annealing (except in the case of permanent mold castings) is almost always an accident resulting from cooling at too rapid a rate to permit normal graphitization. Annealing to remove free carbide is not part of any normal production cycle.

Carbide Breakdown — Castings containing chilled spots should be heated between 1650 and 1750°F, with holding time estimated at 1 to 3 hours, plus 1 hour per inch of section size. However, with some high carbon irons, such as pipe irons, chill can be eliminated in 15 minutes at 1720°F.

In all cases, unless a controlled-atmosphere furnace is used, time at temperature should be as short as possible—at these high temperatures, gray iron is susceptible to scaling. The arbitrary upper limit is 1750°F. Above this temperature there is a tendency for exudation or melting of the phosphide eutectic in irons with over 0.30 per cent phosphorus.

Cooling—The cooling rate for the high-temperature anneal depends on the final use of the iron. If the main object is to break down carbides while retaining maximum strength and wear resistance, the casting should be air cooled from the annealing temperature to about 1000°F to promote formation of a pearlitic structure.

If maximum machinability is the object, the casting should be furnace cooled to 1000°F, with special care to cool slowly through the critical range. In both cases, cooling from 1000°F to about 550°F at not more than 100°F per hour will help avoid internal stresses.

Effect of Alloys — Certain elements, such as carbon and silicon, accelerate pearlite and massive carbide decomposition at annealing temperatures. Where these elements are present in sufficient percentage, the time at annealing temperature may be reduced. At 1380°F for example, complete pearlite breakdown in a high silicon iron occurred in 10 minutes, while 45 minutes was required for breakdown in a low silicon iron.

Elements which tend to stabilize carbides (and retard the rate of pearlite decomposition) include chromium, vanadium, molybdenum and manganese. Of these, chromium is the most effective carbide stabilizer.

Specials — Although chromium prevents maximum softening, of course it possesses an important place where strength and wear resistance must be maintained under severe working and temperature conditions.

Special anneals must be developed for cast irons of unusual analyses. For example, one foundry regularly anneals a high-chromium, cast-iron pump impeller at 1475°F, attaining a brinell hardness of about 300.

They machine the casting and

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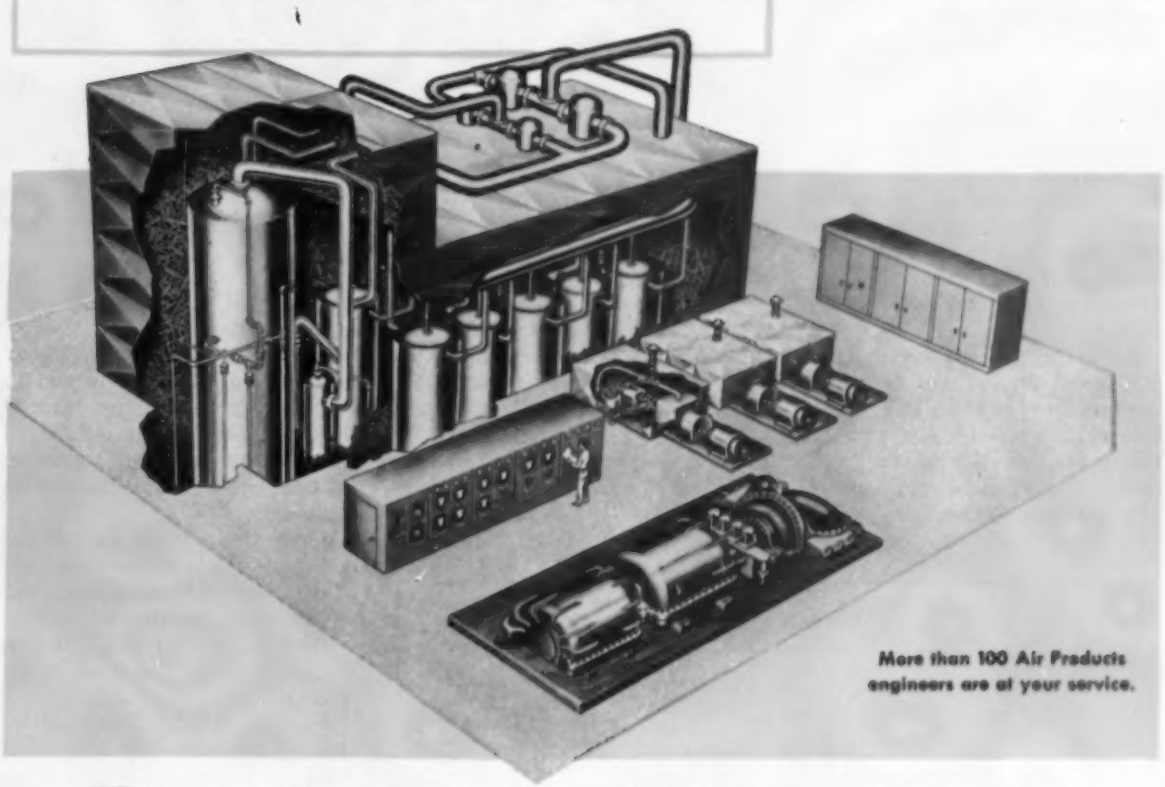

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then heat it again, this time to 1800°F, and quench it with forced air. A hardness of 650 to 700 brinell results. By double heat treatment, a machined casting is produced which is resistant to severe abrasive conditions. Similar double heat treatments can be applied with equal success to plain and low-alloy gray irons.

Compromise—In many instances a producer may want to improve machinability without reducing strength to the comparatively low level of a pure ferrite-graphite gray iron. He can use a partial anneal, involving the breakdown of only part of the pearlite and the spheroidization of the remainder. It is frequently employed for gray irons to which alloying elements have been added for improved strength and wear resistance.

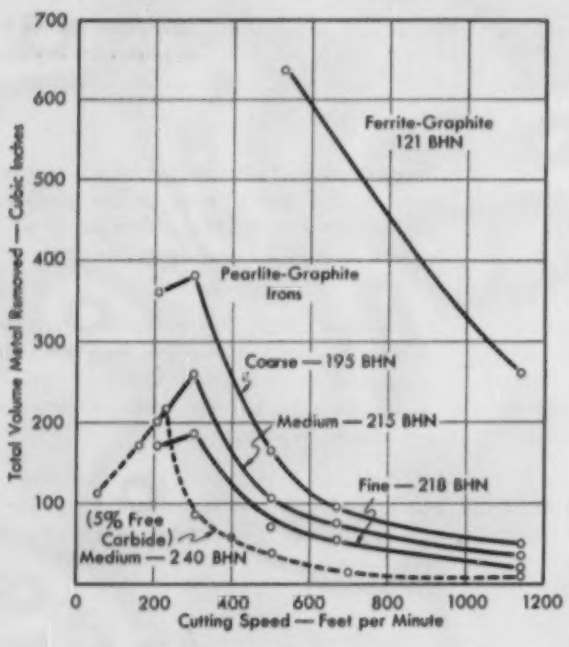
Although the usual machinability anneal is designed to reduce hardness to as low as 105-120 brinell, in special cases such as the pump impeller casting, 300 brinell was considered a machinable hardness level. Many low alloy irons, particularly if they contain appreciable amounts of carbide-stabilizing elements such as chromium, cannot be reduced below 150-200 brinell with any type anneal.

Finish — Unfortunately, annealing has a poor effect on surface finish. The best type gray iron to take an extremely smooth, bright finish is one with a fine pearlitic matrix and a relatively small percentage of finely divided graphite. It is also less machinable. Where ability to take a fine finish is of primary importance, it is better not to anneal the casting completely.

Where an unusually smooth surface finish is not required, and where reduced hardness and strength can be allowed, savings in time, tool replacement and power far outweigh the cost of annealing.

Changes After Annealing at 1400° F

Brinell hardness number	Tensile strength after annealing psi	Tensile strength as cast psi	Alloy additions to base per cent Cr	Mo	Cu	Ni	V
217	44,500	46,200	0.61	0.65	....	....	....
207	43,100	50,600	0.47	0.43	0.52	....	....
207	40,000	41,700	0.56	....	....	....	....
201	38,200	43,000	0.50	....	0.52	....	....
197	42,600	55,500	0.49	0.43	....	1.45	....
187	37,400	52,400	....	0.54	0.65	....	....
179	40,000	48,400	....	0.47	....	....	0.13
156	34,800	45,400	0.49	....	....	1.45	....
156	33,000	50,000	....	0.54	....	0.66	....
156	31,200	41,000	....	....	....	....	0.12
149	29,900	41,700	....	....	....	1.72	....
146	31,600	44,000	....	0.47	....	....	....
143	29,900	43,500	....	....	1.80	....	....
143	27,700	37,400	plain				



Effect of microstructure on machinability of gray iron

Pro and Con — Some of the changes brought about by annealing may be harmful in critical applications. In any case, the user should realize that the annealed casting differs from the same casting before annealing: Tensile strength may be reduced 10 to 30 per cent using the anneals designed to eliminate pearlite. Hardness may be reduced from 30 to 150 brinell points by conversion of pearlite to ferrite plus graphite.

On the credit side, the softer annealed irons, in addition to greatly increased machinability, have increased impact resistance or toughness. They also gain in damping capacity, thermal conductivity, dimensional stability, electrical conductivity and related electrical properties.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

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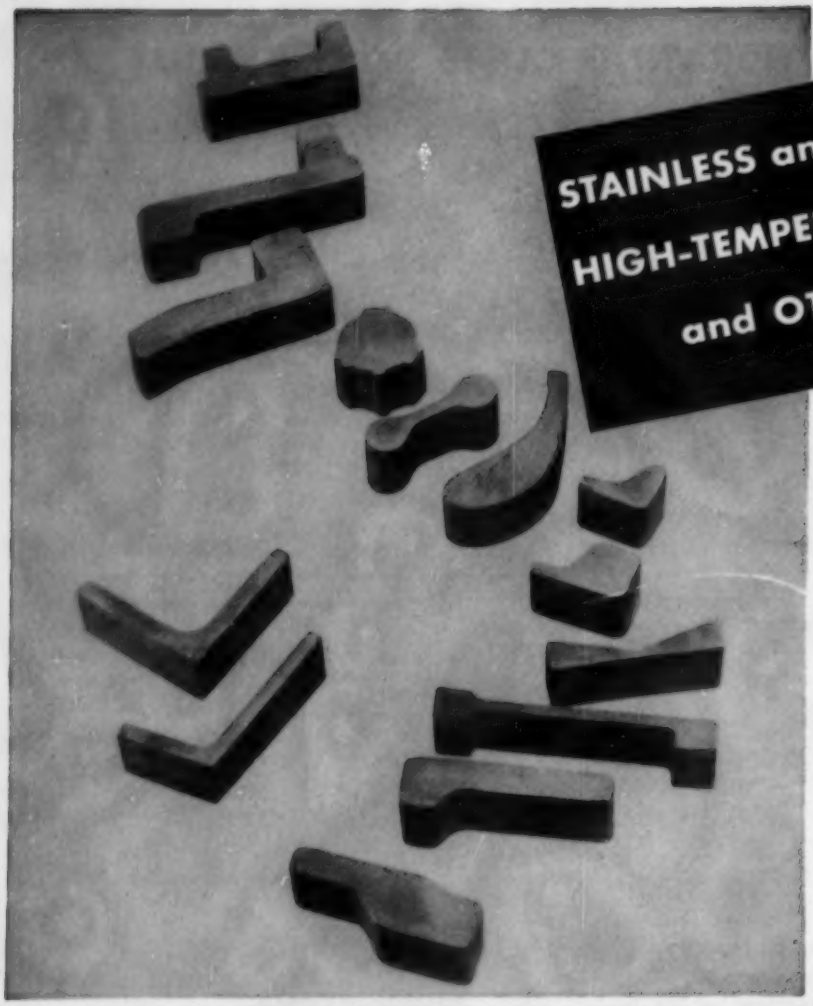

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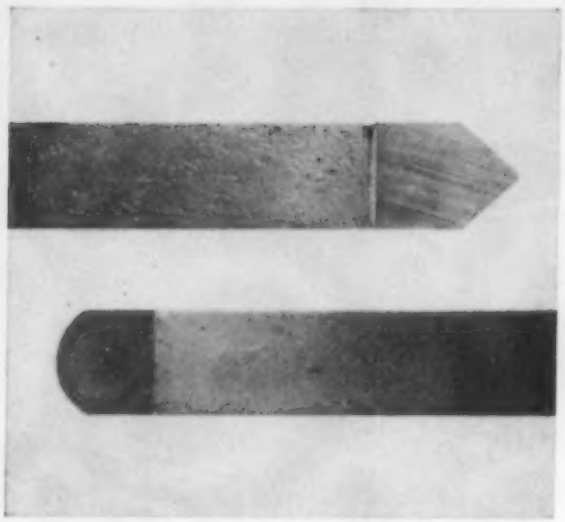

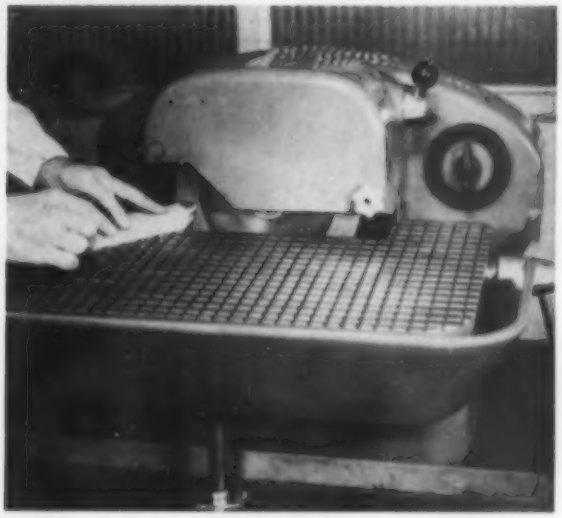

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Tools reserviced by this process have excellent life. They have a surface of minute saucer-shaped impressions that reduce resistance to chip flow and lower the operating temperature of the tool. *Write*: Method X Co., affiliate of Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa. *Phone*: Museum 2-4600

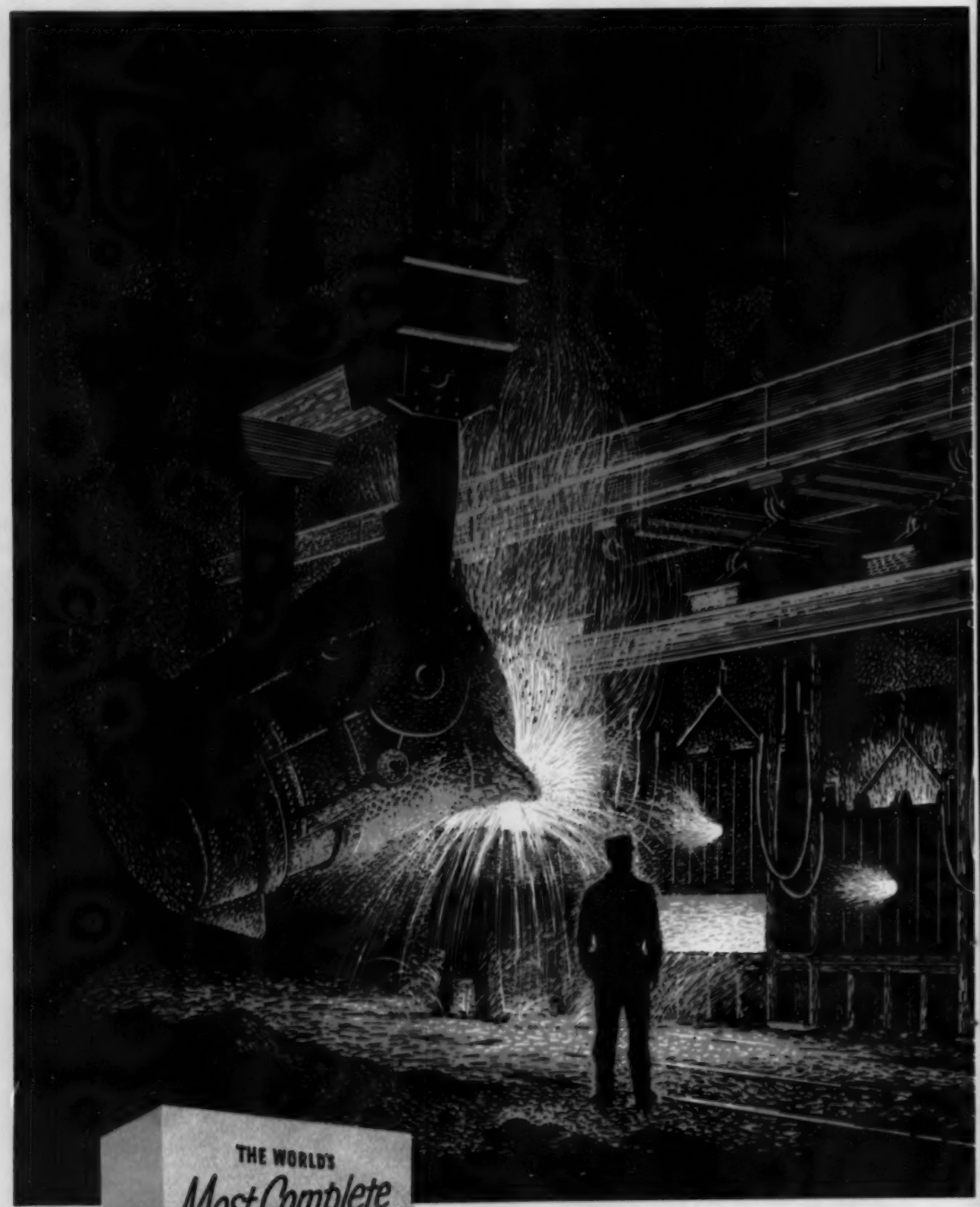
Power Drive Takes Effort Out of Strapping

Air-powered, this strapping machine automatically tensions strapping, then seals and cuts it off in two easy motions.

All the effort of tensioning steel strapping is taken out by the power drive. It provides uniform, predetermined pressure which may be adjusted up to 1600 lb.

The tool gives high joint strength; it's for use with $\frac{5}{8}$ or $\frac{3}{4}$-in. strapping. Due to its cast aluminum base, it is only a few pounds heavier than a hand-operated seal feed tool. The easily loaded magazine has a capacity of 75 seals.

Semiautomatic, the tool gives fast, efficient strapping of skid and pallet loads. It's ruggedly built for low maintenance. *Write*: Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill. *Phone*: Armitage 6-8500



HARBISON-WALKER
AND SUBSIDIARIES

Harbison-Walker

OPEN-HEARTH REFRACTORIES

help reduce steel-making costs

Open-hearth steel furnaces are industry's largest users of refractories. In these furnaces—in which by far the major portion of the world's steel is made—exceedingly severe and widely differing conditions call for refractories of highest quality and having particular combinations of physical and chemical properties. And here the use of Harbison-Walker products continues to reduce operating and maintenance costs.

Among these refractories that give outstanding service are: H-W METALKASE, a metal-encased basic brick pioneered by Harbison-Walker; CHROMEX (chemically bonded) and CHROMEX B (extra hard fired) chrome-magnesite brick; STAR (conventional) and VEGA (the original super-duty) silica brick; H-W C MIX and H-W MAGNAMIX, superior monolithic materials for basic bottoms; FORSTERITE L and various other types and classes for regenerator checkers.

In addition, Harbison-Walker manufactures the full complement of types and classes of high alumina, fire clay and insulating fire brick, and the complete range of castables and plastic refractories for every application.

Technical service based on the most extensive experience and research is freely offered for assistance in determining the refractories best suited for each specific requirement.

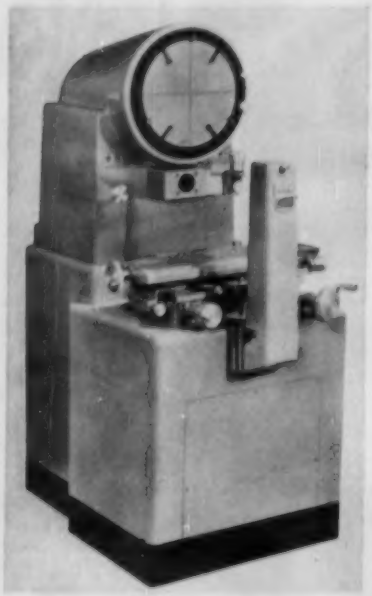
REFRACTORIES COMPANY

World's Largest Producer of Refractories • General Offices—Pittsburgh 22, Pa.

NEW PRODUCTS and equipment

Contour Projector

A 14-in. screen is combined with maximum table travel. The 26 x 8 in. worktable makes for easy positioning of large parts. Table travel is 8 in. in both horizontal and vertical planes; focusing travel is 3 in.

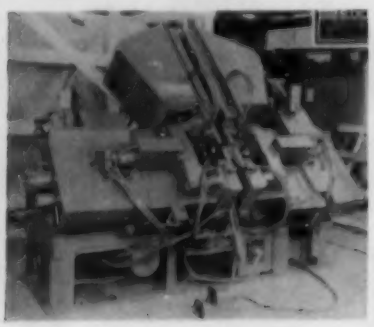


Intricate parts are measured to 0.0001 in. A lens turret permits the choice of six magnifications. *Write*: Special Products Sales Division, Eastman Kodak Co., Rochester 4, N. Y. *Phone*: Oregon 9-1840

Flash Butt Welder

Aluminum can be welded to copper tubing with this unit. It also welds aluminum or copper round stock similar to overhead trolley lines. Tubing up to 2 in. in diameter can be handled.

The secondary voltage is adjustable in 32 steps, from 1.1 to 9.3 volts. Top secondary current is 44,000 amperes. *Write*: Dept. M-5, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill. *Phone*: Portsmouth 7-5600



Colored Metal

Prefinished metal in permanent colors cuts production time. Aluminum, cold-rolled steel and other metals come in coils or sheets. Widths range from ½ to 36 in., slit to specification.

The metal is roller-enameled in 13 standard colors; others are available. Metal thicknesses are from 0.016 to 0.040 in. *Write*: Southern States Iron Roofing Co., P.O. Box 1159, Savannah, Ga. *Phone*: 6-2461.

Power Cutter

Here is a tool that can do straight, circle and louvre cutting, plus beading, folding and doming. It comes with a 28½ or 48-in. throat and has a variable stroke adjustment.

The unit — it's described as a sheet metal shop in one unit—is powered by a ¾-hp motor. *Write*: Nord Corp., 18 Spruce St., Nutley, N. J.

Drill-Tapper

The multispindle machine is for small hole drilling and tapping where fast production is needed but volume doesn't justify special equipment.

The machine drills up to eight No. 25 holes. Spindle speed is 2700 rpm; estimated operating speed is 1200 strokes an hour.

In drilling, a 1-hp, 220/440 volt, 3-phase, 60-cycle motor operates continuously in one direction. In tapping, the motor is reversed to back out the tap when thread depth is reached. *Write*: Cleveland Tapping Machine Co., Canton 6, O. *Phone*: 6-3453

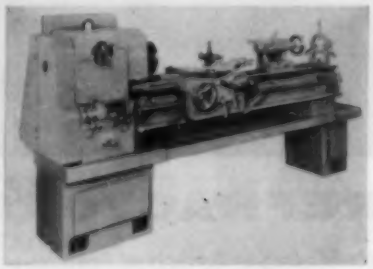
Toggle Switch Starters

These alternating-current starters are for manual across-the-line starting of small single-phase motors. They come in single or double-pole types for a maximum of 220 volts, 25 to 60 cycles.

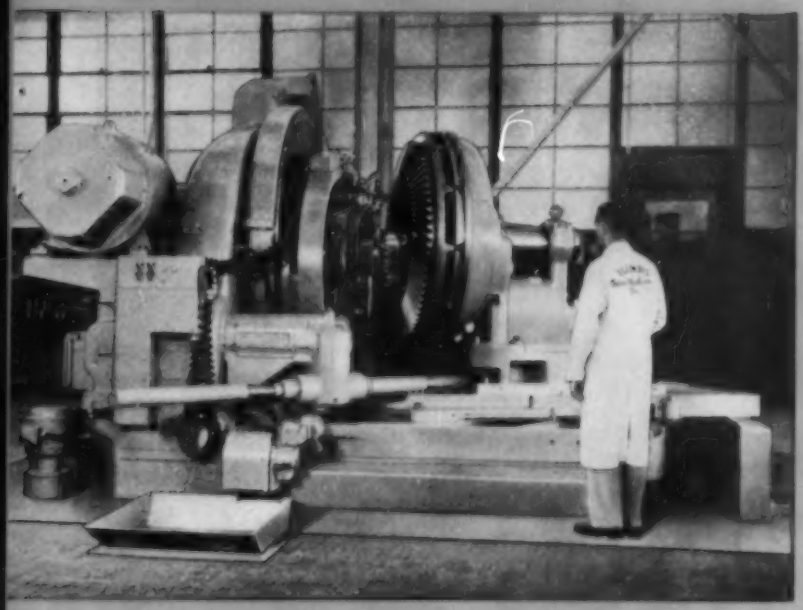
Interchangeable heaters give overload protection. The starter comes in NEMA type I, IV and VII enclosures. *Write:* Clark Controller Co., 1146 E. 152nd St., Cleveland, O. *Phone*: Ulster 1-2000

Toolroom Lathes

All-geared head, toolroom lathes in 10, 12½, 15 and 18-in. sizes have

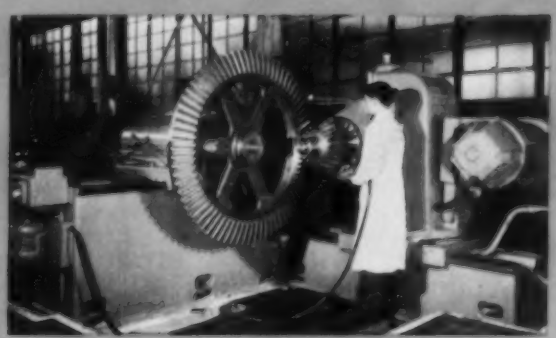


BIG SPIRAL BEVEL ZEROL BEVEL HYPOID GEARS

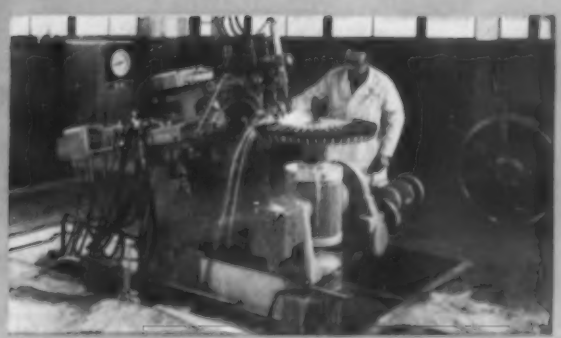


PRECISE GENERATION OF BIG BEVEL GEARS

This new No. 170 Spiral Bevel and Hypoid Gear Generator is the nucleus of the most modern and productive unit of large bevel gear generating machinery in the world. It generates spiral bevel, zerol bevel, and hypoid gears to 72" diameter, 2.875" tooth depth (.75 D.P.), 10" face, and 10" hypoid pinion offset above or below centers. The localized gear tooth bearing, an established necessity for today's heavily loaded gear drives, is precisely controlled to your specifications.



POWER TESTING—This new No. 61 Angular Hypoid Testing machine is the most advanced of its kind. Large spur, helical, herringbone or bevel gears are operated under load at any shaft angle, giving exact inspection of tooth contact under operating conditions. It will efficiently test gears up to 90" diameter and hypoid offsets to 10" above or below centers.



SURFACE HARDENING—This new No. 2 Flame Surface Hardening machine is closely controlled electronically to produce precise, uniformly distortion-free results—it's the all important climax to our large gear production facilities. Spur, helical, bevel and hypoid gears to 120" diameter, .75 D.P., and 18" face are surface hardened in this machine.

Visit our modern plants—see the finest equipped plants in the world—designed to serve you.

Look for this mark ... the symbol on finer gears

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

2108 NORTH NATCHEZ AVENUE • CHICAGO 35, ILLINOIS

NEW PRODUCTS and equipment

12 spindle speeds in geometric progression.

An automatically lubricated quick change gear box makes 48 thread and feed changes available.

The ways of the bed are ground and can be flame hardened.

Choice of motors: 1, 1½, 2 or 3 hp. *Write*: Cincinnati Lathe & Tool Co., Cincinnati, O. *Phone*: Redwood 2121

Shaper-Planer

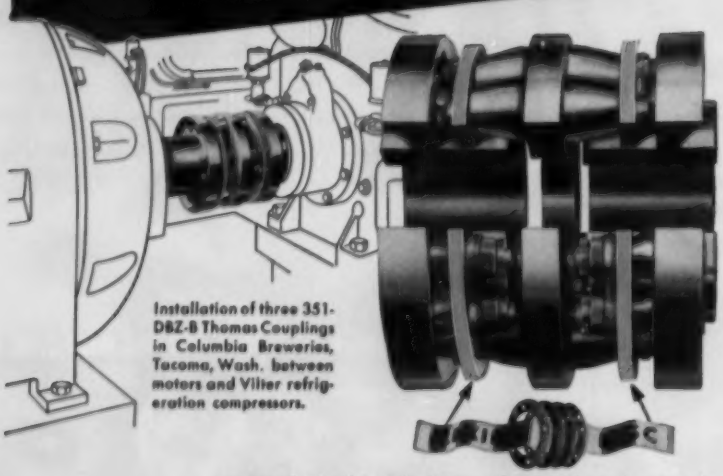
Increased machining efficiency is afforded by the hydraulic triple circuit of this machine, which has a flexible combination of cutting force and speed to suit machining conditions. The machine is available in several sizes.

Cutting speeds range from 10 to 300 fpm. Table sizes range from 24 x 30 in. to 36 x 42 in. Stroke lengths go from 6 to 20 ft.

Top crossfeed and vertical feed

to all heads is 0.500 in. Equipping the tool head saddles and the vertical feed slides with adjustable double nuts eliminates backlash and makes job setups easier. *Write*: Dept. W, Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill. *Phone*: 3-7611

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

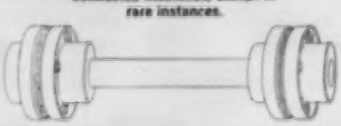


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



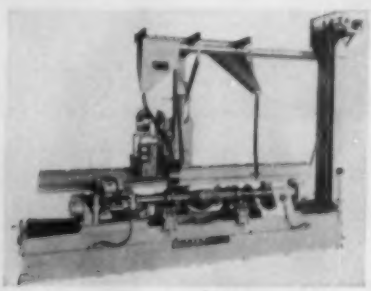
Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Shielded-Arc Welder

Here is a semiautomatic welding machine that makes circular welds on axle assemblies up to 13 ft long.

A 19-ft steel bed supports fixtures that move along it to suit assembly length variations. Conventional, submerged-arc welding equipment is mounted on the ways. Flux and welding wire are fed automatically. A ½-hp motor rotates the assembly to be welded.



The machine has a preheating unit and a mechanical flux recovery unit. *Write*: Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

Press Brakes

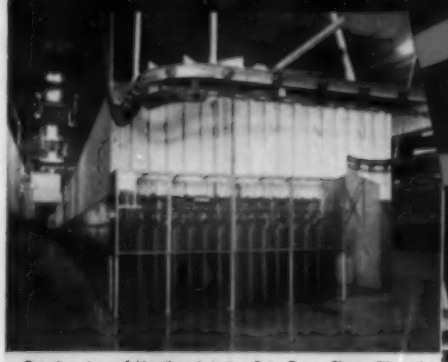
These new machines feature greater precision and increased production in the bending and forming of sheet metal and steel plate.

An all-steel welded frame, a deep section bed and a ram of rolled steel plate assure permanent alignment and minimum deflection under load.

The clutch can be jogged or slipped to meet operating conditions. A split ram adjusts for tapered work. A series of four

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Exterior view of Ventilated Active Drip Zone. Clean, Filtered Air is Supplied to this enclosure. Fume-laden air is exhausted.

View showing glass in one side of Inactive Drip Zone where parts may be seen prior to entering Baking Oven.

View of Mahon Flow-Coating Equipment at Chrysler Corporation of Canada, Limited. This is part of a Complete Mahon Finishing System for Coating Black Enamel Parts.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

View of Mahon 450° Enamel Baking Oven. Oven is built against ceiling trusses to provide parts storage space below.

Another view of the Enamel Baking Oven. Finish is baked for 20 minutes at 450° in this 80 Ft. x 24 Ft. Mahon Oven.

Black Enamel Parts at CHRYSLER CORPORATION of CANADA, LIMITED, are FLOW-COATED in MAHON FINISHING SYSTEM!

In addition to the body finishing system at the Windsor plant of Chrysler Corporation of Canada, Limited, Mahon also installed a complete finishing system for black enamel parts. This is a Flow-Coating System which includes a Mahon Flow-Coating Machine, a Ventilated Active Drip Zone, a Ventilated Inactive Drip Zone, and a 450° Finish Baking Oven with storage space below. Two Enamel Mixing Tanks and a Solvent Tank are provided outside the enclosure. The recirculating unit is equipped to automatically maintain the enamel at a specific temperature in the Flow-Coating Chamber. This is a typical Mahon Flow-Coating System, complete in every detail—automatic from start to stop. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether your job is to be Flow-Coated, Dip-Coated, or Spray Painted either Manually or by Electrostatic Process, you will find that Mahon equipment will serve you better, because it is engineered better and built better for more economical operation over a longer period of time. Mahon will do a complete job for you on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES ENGINEERING OFFICES in NEW YORK AND CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

"Amazing how little this **TORRINGTON NEEDLE BEARING** *costs!"*

Initial cost of the Torrington Needle Bearing is much less than that of any comparable anti-friction bearing. But economy in first cost is only the start of savings which accrue to users of the Needle Bearing.

Because of its unit construction and small size, housings and related members can be made smaller and lighter.

Ease of installation trims costs on the assembly line, too. Just a simple operation on an arbor press places the hardened outer shell of the Needle Bearing in the housing.

Throughout the life of the completed assembly, the Torrington Needle Bearing continues to pile up benefits. Low friction, high load capacity and retention of lubricants all contribute to the characteristically long service life of Needle Bearings.

For twenty years, our Engineering Department has helped designers and manufacturers throughout industry to adapt the unique advantages of the Needle Bearing to their products. Let us help you make the Needle Bearing "standard equipment" in yours.

See our new Needle Bearing Catalog in the 1955 Sweet's Product Design File —or write direct for Catalog No. 55.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.

District Offices and Distributors in Principal Cities of United States and Canada

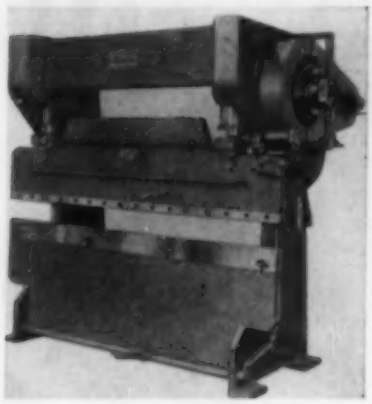
TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

These features make the **TORRINGTON NEEDLE BEARING** *unique*

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

NEW PRODUCTS and equipment



brakes has capacities from ¼-in. to 14 gage. *Write*: Dreis & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill. *Phone*: Triangle 4-1200

Stainless Alloy Paste

This new product is recommended for brazing stainless steels, alloys of the nickel-base and cobalt-base types, low alloy steels, carbon steels and copper.

The paste is easily applied by brushing or dipping. It is a mixture of nickel-chrome-boron alloy powder and a new creamy flux. *Write*: Stainless Processing Division, Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. *Phone*: Twinbrook 3-3800

Screw Slotting Machine

Over 50,000 slotted blanks can be produced in an hour. The machine slots standard or special headed ferrous or nonferrous blanks (from No. 6 to ¼-in. in diameter and up to 2½-in. long).

Slotting speeds range from 60

to 864 pieces a minute. The only tooling required is a saw and burr-remover blades made from spring steel. *Write*: Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. *Phone*: Plaza 6-3621

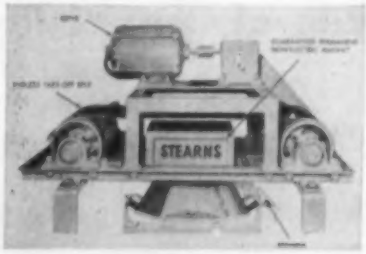
Filter

Hydraulic systems of large high-speed machine tools can use a new easily replaced filter. Micronic-size particles are filtered from hydraulic fluids of 1000 psi. Flow rates of up to 75 gpm are handled. The filter is made of resin-impregnated paper and fits in an all-steel case. *Write*: Purolator Products Inc., Rahway, N. J. *Phone*: Rahway 7-4000

Magnetic Separator

Tramp iron is removed and automatically discharged with this crossbelt separator.

Suspended above a conveyor belt, chute or sorting table, the Alnico V permanent magnetic components pull tramp iron out of the material



flow. Iron is attracted to the magnet face where a cleated, endless belt carries it out of the magnetic field and discharges it. *Write*: Stearns Magnetic Inc., Milwaukee 46, Wis. *Phone*: Evergreen 3-4800

Surface Comparator

The judging of surface roughness is speeded by this comparator; it can be used on the production line. The surface and the selected standard are viewed under 10-power magnification.

The instrument is suitable for examining surfaces after milling, turning, grinding, planing, buffing, polishing, plating, painting and lacquering.

Two small batteries illuminate the pocket-size unit. *Write*: Bausch & Lomb Optical Co., 625 St. Paul St., Rochester, N. Y. *Phone*: Locust 3000

NEW literature

Write directly to the company for a copy

Car Spotter

Here is a unit that hauls, switches and spots railroad cars. It also has road wheels and can be used as a prime mover of wheeled shop trailers, carts and skids—bulletin T-115. Whiting Corp., Harvey, Ill.

Controlled Volume Pumps

Pumps for water treating systems are described and illustrated in typical systems—bulletin 953, 20 pages. Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Crane Catalogs

Here is a description of hand-powered traveling cranes—catalog 63, 18 pages. Motor-driven units are covered in catalog 62, 20 pages. Reading Crane & Hoist Corp., 2100 Adams St., Reading, Pa.

Band Saws

A blade and speed selection chart for metal cutting is included with data on a line of band saws—catalog G-55, 8 pages. Wells Mfg. Corp., 1515 Fillmore St., Three Rivers, Mich.

Refractories

Recommendations for block mix use in annealing pit covers, arches for insulation, boiler top decks, etc., are given—bulletin 215, 2 pages. Mixing instructions and the complete refractory line are covered in bulletin 350, 4 pages. J. H. France Refractories Co., 1944 France Rd., Snow Shoe, Pa.

Blast Cleaning

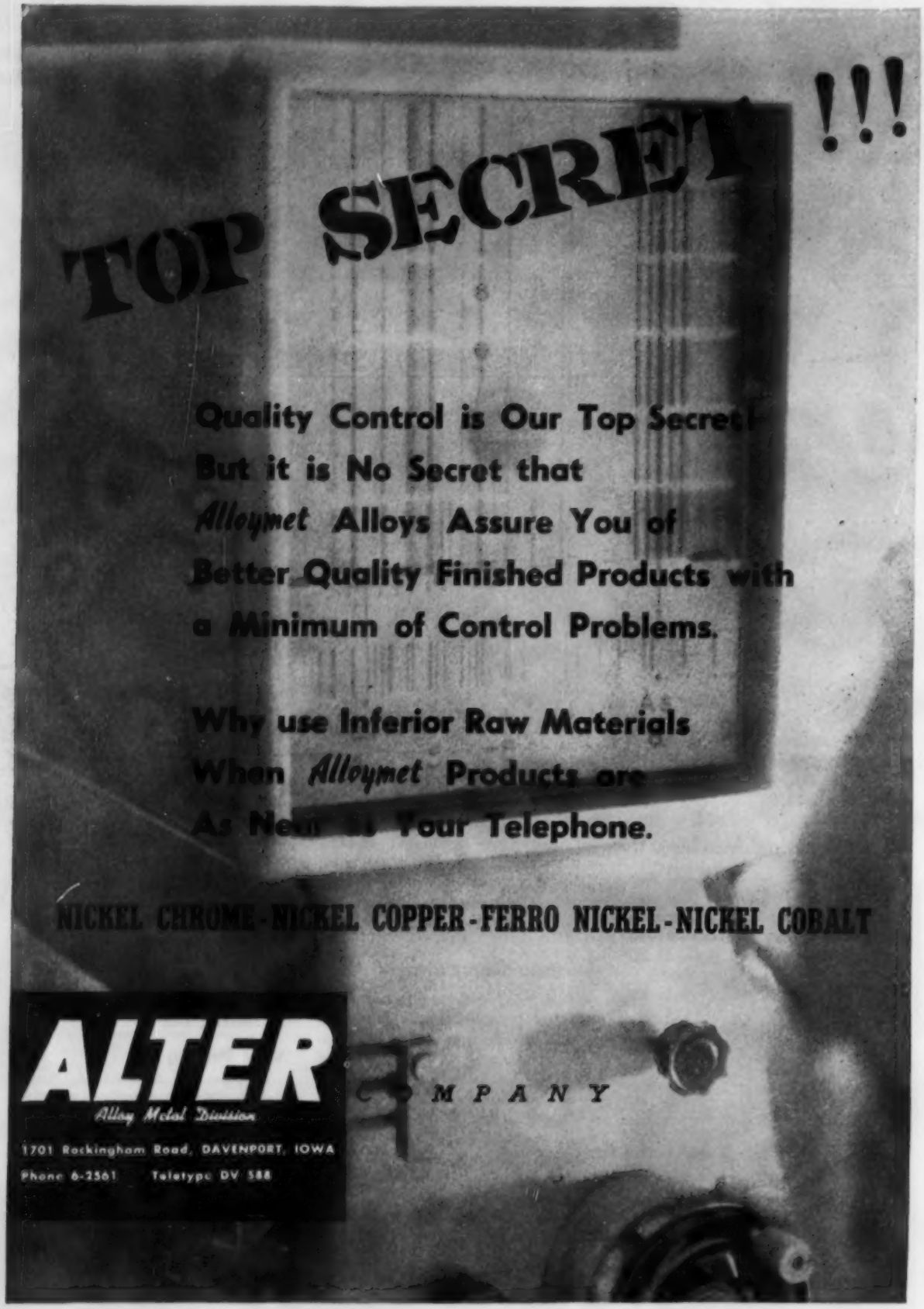
A table-type, airless, blast cleaning machine for castings, forgings, weldments, stampings and heat treated parts is described—bulletin 100-D, 4 pages. American Wheelabrator & Equipment Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Steel Decking

Features of lightweight, fire-resistant ribbed steel sections are given —4 pages. American Steel Band Co., P.O. Box 565, Pittsburgh 30, Pa.

Cold-Roll Forming

This is an illustrated story of the equipment and process of cold-roll forming. Also discussed: Auxiliary equipment used in production lines and uses of end products—88 pages. Yoder Co., 5500 Walworth Ave., Cleveland 2, O.


TOP SECRET !!!
Quality Control is Our Top Secret!
But it is No Secret that
Alloymet Alloys Assure You of
Better Quality Finished Products with
a Minimum of Control Problems.
Why use Inferior Raw Materials
When Alloymet Products are
As Near as Your Telephone.
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Market Outlook

INVENTORY BUILDING will help keep steel demand strong in the first half of next year.

Steel users have been inclined to build inventories this year, but they haven't made much headway. They added only 1.9 million net tons of finished steel in the first eight months of 1955. That's only a week's supply now.

POWERFUL—There will be two incentives to build inventories: 1. High rate of consumption. 2. Midyear increases in steel prices.

When consumption is high, consumers not only need a good supply of material on hand, but they're inclined to buy all they can get. Consumption is expected to continue high in the first half. The automobile industry is optimistic; the heavy construction industry is continuing strong; and the railroad industry has re-entered the steel market.

CONCURRENCE—C. M. White, president, Republic Steel Corp., says, for instance: "Orders for future delivery point to capacity operations for the first half of 1956." When the steel operating rate exceeds 90 per cent of capacity, steel users traditionally try to build inventory, he points out. When steel operations fall to the lower 80s, consumers try to reduce inventories.

Higher prices for steel in 1956 (they should come about midyear) are inevitable. Steel in stock will be better than money in the bank.

CAUSES—Price increases will stem from two factors: 1. Steelworkers' union contracts will come up for renewal at the end of June. 2. Steel producers will be seeking funds to expand and renew their plants.

A new labor contract will cost more. To help pay for it, higher prices will be necessary.

A big expansion of the steel industry is in the making. Some substantial programs already have been announced. To get funds for the expansion, and for replacement of present equipment as it becomes obsolete or worn out, the steel industry must make itself attractive as a place for investment. One of the ways is through price structure. In the last couple of weeks, three steel company heads have commented on the need for higher steel prices.

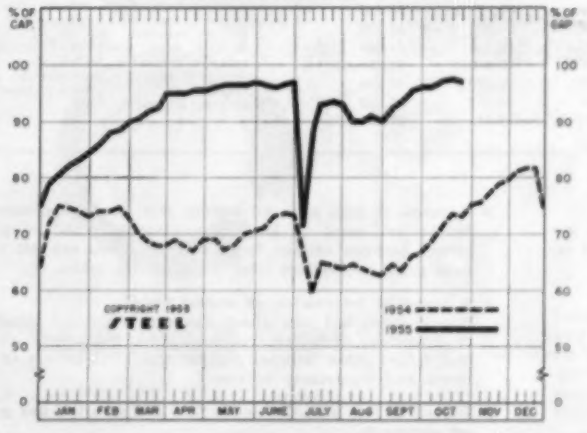
NEAR THE TOP—Meanwhile, steel producers are producing at near capacity to satisfy demand. In the week ended Oct. 16, output of steel for ingots and castings was at 97 per cent of capacity, a decline of only half a point.

PRICES—Prices of zinc-coated steel were expected to rise should a half-cent-a-pound boost by one producer in the price of zinc to 13.5 cents, East St. Louis, Ill., for prime western grade become firmly established. The rise would push galvanized steel sheets and galvanized steel pipe into the next higher bracket of coating extras. Galvanized wire also would be affected.

Galvanizing extras are not figured in STEEL's price composite on finished steel, so it remains at $128.14 a net ton. STEEL's price composite on steelmaking scrap is down 33 cents, to $45 a gross ton.

Prices of imported steel have risen 10 to 50 cents per 100 lb, depending on the product. Because of heavy demand in the U. S., foreign mills are able to advance prices to levels higher than they can get in most other markets.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Oct. 22	Change	Same Week 1954	Same Week 1953
Pittsburgh	102	+ 0.5	71.5	97
Chicago	97	— 0.5*	79.5	98
Mid-Atlantic	96.5	+ 2	65	97
Youngstown	100	+ 2	74	104
Wheeling	99	+ 1	82	98
Cleveland	100	— 3.5*	82	100
Buffalo	105	0	75.5	106.5
Birmingham	97.5	0	74	96.5
New England	90	0	58	85
Cincinnati	86.5	— 5	70	80.5
St. Louis	106	+ 3.5	69.5	95.5
Detroit	98	+ 4	82	100.5
Western	102	+ 3	60	100
National Rate	97	— 0.5	73	96.5

INGOT PRODUCTION‡

	Week Ended Oct. 23	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	144.4†	145.0	144.4	110.1
NET TONS (In thousands)	2,320†	2,330	2,320	1,769

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,284,459 in 1953.

Metalworking Outlook—p. 45 Technical Outlook—p. 103

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Oct. 18 1955	Oct. 11 1955	Month Ago	Sept. Average
(1947-1949=100)	154.5	154.5	153.9	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 18

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.992
Tie Plates	5.635	Strip, C. R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.306
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.469	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.69 (lb)	1.185	Tubes, Boiler (100 ft)	30.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.650	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.575
Bars, C.F., Stainless, 302 (lb)	0.465	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.230	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.568		

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 19 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	207.56	194.53	187.62
Index in cents per lb	5.661	5.661	5.623	5.270	4.270

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$127.41	$117.95	$95.00
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.35
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	48.10
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	49.63
Steelmaking Scrap, GT	45.00	45.33	44.33	32.33	41.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 19 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.50	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50-3.75
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.15-4.50
Strip, C.R., Chicago	6.35	6.35	6.35	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50-4.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30-5.60
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.05	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$54.50	$54.50	$54.50	$78.00	$63.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$48.50
Basic, Valley	58.50	58.50	58.50	56.00	47.50
Basic, deld. Phila.	62.16	59.16	59.16	59.66	51.44
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, deld. Phila.	62.66	59.66	59.66	59.16	51.94
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.85	45.85
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	52.58
Malleable, Valley	59.00	59.00	59.00	56.50	49.50
Malleable, Chicago	59.00	59.00	59.00	56.50	48.00
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$44.50	$43.50	$32.50	$44.00
No. 1 Heavy Melt, E. Pa.	46.50	46.50	46.50	31.50	40.50
No. 1 Heavy Melt, Chicago	44.00	45.00	43.00	33.00	40.00
No. 1 Heavy Melt, Valley	48.00	48.00	46.50	35.00	43.75
No. 1 Heavy Melt, Cleve.	45.50	44.50	44.00	32.00	43.25
No. 1 Heavy Melt, Buffalo	38.50	38.50	38.50	30.50	41.50
Rails, Rerolling, Chicago	65.50	65.50	64.50	56.00	64.50
No. 1 Cast, Chicago	48.50	48.50	47.50	39.50	53.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Oct. 19	Last Change	Previous Price	Sept. Avg.	Aug. Avg.	Oct. 1954 Avg.
Copper	43.00-45.50	Oct. 7, 1955	43.00-50.00	45.380	37.739	30.000
Lead	15.50	Sept. 26, 1955	14.80	14.920	14.800	14.775
Zinc	13.00-13.50	Oct. 17, 1955	13.00	12.940	12.800	11.500
Tin	96.125	Oct. 12, 1955	96.25	96.565	96.519	93.110
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.267	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	30.574	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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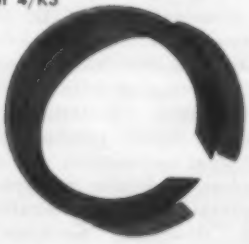

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Nonferrous Metals

Price fluctuations take over the silver market after two years of calm as Mexico, the world's largest producer, discontinues all sales of the precious metal

Nonferrous Metal Prices, Pages 140 & 141

SILVER PRICES are on the go. After being quoted at 85¼-cents per ounce (New York) for over two years, a mild buying panic started prices rising until they hit 92¼-cents on Oct. 11—the highest in 35 years.

Reasons—With the production of U. S. silver (37 million ounces in 1954) being absorbed by the government, the open market in this country is dependent on supplies from the world's largest producer, Mexico. The Bank of Mexico buys all the country's production (47 million ounces, 1954) and for over two years controlled the price of silver on the open market by selling or holding reserves of the precious metal. This kept the price of silver at 85¼-cents per ounce from Jan. 16, 1953, until Mar. 15, 1955.

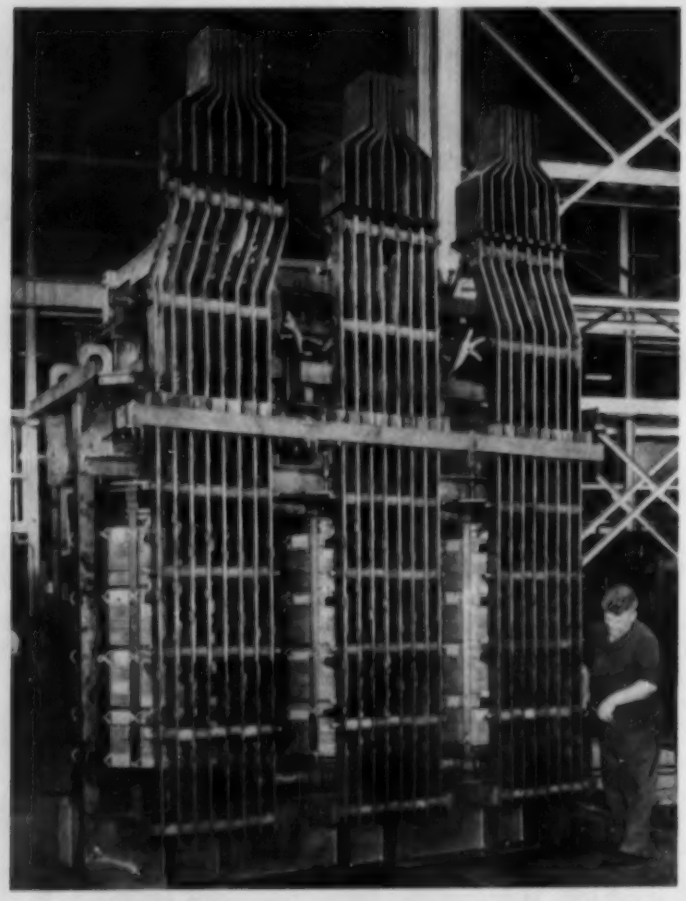
During this period, the Bank of Mexico sold more than it purchased. After selling 17 million ounces to Saudi Arabia and 6 million ounces to others, its stocks were reduced to some 11 million ounces—7 million ounces being in unmelted or melted coins. The Bank announced that it would continue to buy silver at 85¼-cents, but would discontinue selling. Result: Coinage orders from abroad and large purchases for Western Germany were added to the open market.

Domestic Rundown — Under the Silver Purchase Laws, the U. S. government pays 90½-cents per ounce. This virtually assures that all domestic production goes to the treasury. However, producers are still free to sell on the open market. The treasury is allowed to sell silver for use in the arts and industry out of its holdings of unmonetized or "free silver." This price, set by the secretary of the treasury, is currently 91 cents per ounce, New York. Treasury silver shipped from the West Coast is quoted at 92¼-cents—1¼-cents being charged for freight and handling.

Canada may hold the key to future price stabilization. Since World War II, its production has more than doubled because of the rapid mining expansion. Handy & Harman estimates that 1954 production reached 31 million ounces, an increase of 10 per cent over 1953. In the last five years, Canada's production has increased by about 2.7 million ounces annually.

Silver, as a base material or an alloying element, finds many uses in electrical contacts, electronic equipment, bearings and as a brazing alloy. Film and mirror production are dependent upon silver nitrate. Handy & Harman explains: "In recent years, the consumption of silver in industry has exceeded in volume the more traditional uses in the arts."

Outlook: World production will remain about constant (214 million ounces in 1954), but uses for silver will continue to grow.



Chimneys of Copper

This 15,000-kva transformer built by General Electric Co. for Atlantic Steel Co. will convert high-voltage, low-current power to low-voltage, high-current electricity for use in an electric furnace at Atlanta, Ga.

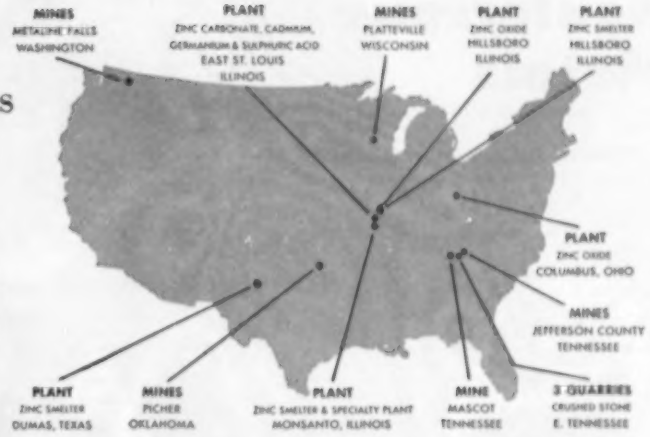
More Stockpile Rules Issued

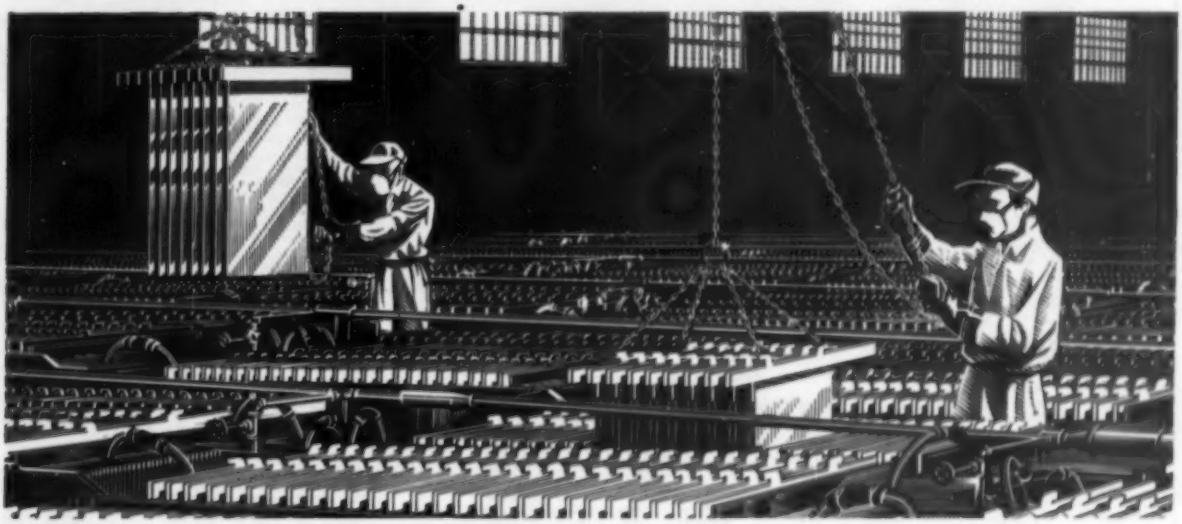
President Dwight D. Eisenhower has granted limited authority to Arthur S. Flemming, director, Office of Defense Mobilization, to order withdrawal of materials from stockpile for defense purposes in the event of total mobilization. This gave the defense mobilizer an opportunity to reiterate the administration's stand on stockpiled materials. (They should be used only in event of war or common defense, and not to bolster the civilian economy.)

Some pressure has been placed on the administration to interpret high prices and peak civilian demand as a matter of "common defense."

American Zinc and its products

from A *to* Z





OPERATIONS AT MONSANTO, ILLINOIS

Modern and recently expanded electrolytic plant producing special high grade slab zinc, which is sold primarily to the die casting and brass manufacturing industries. In conjunction is a specialty plant for the production of zinc ball anodes, heavy plating anodes and anodes for cathodic protection. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc sales Company

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 23.00, Lone Star brand, 23.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 45.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $276-$281 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $3.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $50-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $91-$97 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 92.00 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 96.125; prompt, 96.00.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00-13.50; brass special, 13.25-13.75; intermediate, 13.50-14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35-14.85; special high grade, 14.50-15.00, deld. Diecasting alloy ingot No. 3, 17.25-17.75; No. 2, 18.25-18.75; No. 5, 17.75-18.25, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.00-33.00; No. 12 foundry alloy (No. 2 grade), 30.50-31.50; 5% silicon alloy, 0.60 Cu max, 32.00-33.00; 13 alloy, 0.60 Cu max, 32.00-33.00; 195 alloy, 32.00-33.25; 108 alloy, 30.50-31.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.25-32.25; grade 2, 30.25-31.25; grade 3, 29.50-30.50; grade 4, 29.00-30.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 24.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 24.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.85; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l., 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $3.75; hot-rolled and forged bars, $5.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 26.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	87	74	93
Seamless Tubes	122	116	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.126	37.5	42.3	...	...
0.125-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate, 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 3 in., 63.40c. I-beams, 3 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50; old sheets, 16.50-17.00; borings and turnings, 11.00; crankcases, 16.50-17.00; industrial castings, 16.50-17.50.

Copper and Brass: No. 1 heavy copper and wire, 35.50-36.00; No. 2 heavy copper and wire, 34.00-34.50; light copper, 31.50-32.00; No. 1 composition red brass, 28.00-29.00; No. 1 composition turnings, 27.00-28.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76b	60.36c	....	62.82	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	55.09	55.03	56.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.49	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.56	66.68e	37.625	37.375	36.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	25.750
Munts Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 15.50-16.00; new brass clippings, 25.00-25.50; light brass, 17.00-17.50; heavy yellow brass, 19.50-20.00; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 23.00-23.50; cocks and faucets, 23.00-23.50; brass pipe, 23.00-23.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-7.00; linotype and stereotype, 14.00-14.75; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-60.00; old sheets, 45.00-50.00; turnings, 44.00; rods, 54.50-60.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap; 3.50-4.00.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.50-23.00; 3003 clippings, 22.25-23.00; 6151 clippings, 22.00-23.00; 5052 clippings, 22.00-23.00; 2014 clippings, 21.50-22.00; 2017 clippings, 21.50-22.00; 2024 clippings, 21.50-22.00; mixed clippings, 21.50-22.00; old sheet, 19.00-19.50; old cast, 19.00-20.50; clean old cable (free of steel), 22.00-23.00; borings and turnings, 19.00-21.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

Copper and Brass: No. 1 copper and wire, 39.00; No. 2 copper and wire, 37.00-37.50; light copper, 34.75-35.25; refinery brass (60% copper) per dry copper content, 35.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper and wire, 39.00; No. 2 copper and wire, 37.00-37.50; light copper, 34.75-35.25; No. 1 composition borings, 31.00; No. 1 composition solids, 31.50; heavy yellow brass solids, 21.50-22.50; yellow brass turnings, 20.50; radiators, 24.00-25.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.42, oval, 58.92, 5000-10,000 lb; electrodeposited, 56.78, 2000-5000 lb lots; cast 62.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.145; 200-499 lb, $1.13; 500-999 lb, $1.125; 1000 lb or more, $1.12.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 35.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,000 lb, 31.25; 34,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 72.50; 100-600 lb, 56.10; 700-1900 lb, 55.70; 2000-9900 lb, 53.90; 10,000 lb or more, 52.80.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.568; 50 lb, $1.248; 100-300 lb, $1.098; 400-900 lb, $1.074; 1000-1900 lb, $1.049; 2000-4900 lb, $1.013; 5000-19,900 lb, 95.20; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, $1.287; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

TOUGH!

U. S. Patent # 2184926
(Other patents pending)

Is your present abrasive tough enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned.* Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test—put muscle behind *your* blast cleaning with Malleabrasive! *We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.*

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

MALLEABRASIVE®

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 143. Key to footnotes, page 145.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$60.50

INGOTS, Alloy (NT)
Detroit R7 .....$69.00
Houston S5 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$65.50
Bessemer,Pa. U5 .....65.50
Bridgeport,Conn. N19..73.50
Buffalo R2 .....65.50
Clairton,Pa. U5 .....65.50
Ensley,Ala. T2 .....65.50
Fairfield,Ala T2 .....65.50
Fontana,Calif. K1 ....76.00
Gary,Ind. U5 .....65.50
Johnstown,Pa. B2 ....65.50
Lackawanna,N.Y. B2 ..65.50
LoneStar,Tex. L6 ....74.50
Munhall, Pa. U5 .....65.50
Pittsburgh J5 .....65.50
S.Chicago,Ill. R2, U5..65.50
S.Duquesne,Pa. U5 ...65.50
Youngstown R3 .....65.50

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R3 .....84.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana, Calif. K1 ....92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston S5 .....89.50
Johnstown,Pa. B2 .....84.50
Lackawanna,N.Y. B2..84.50
LosAngeles B3 .....84.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....88.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R3, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 .....96.00
Houston S5 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$103.50
Canton,O. R3 .....103.50
Cleveland R3 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP
Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R3 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS
AlabamaCity,Ala. R3 ..5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill. L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston S5 .....5.275
IndianaHarbor,Ind. Y1..5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 ....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C16 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11..5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 .....5.025
Roebling,N.J. R5 ....5.125
S.Chicago,Ill. R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....4.60
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 ....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston S5 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange
Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes
Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houston S5 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B2 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.80
Lackawanna,N.Y. B2 ...6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.80
Aliquippa,Pa. J5 .....4.80
Ashland,Ky.(15) A10 ...4.80
Bessemer,Ala. T2 .....4.80
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.80
Clairton,Pa. U5 .....4.80
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 .....4.80
Conshohocken,Pa. A3 ..4.80
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.80
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.80
Geneva,Utah C11 .....4.80
GraniteCity,Ill. G4 ....4.70
Harrisburg,Pa. C5 ....5.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.80
Johnstown,Pa. B2 ....4.80
Lackawanna,N.Y. B2 ...4.80
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.80
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.80
Newport,Ky. N9 .....4.80
Pittsburgh J5 .....4.80
Riverdale,Ill. A1 .....4.80
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.80
S.Chicago R2, U5, W14.4.80
SparrowsPoint,Md. B2 ..4.80
Steubenville,O. W10 ....4.80
Warren,O. R2 .....4.80
Weirton,W.Va. W6 .....4.80
Youngstown R2, U5, Y1.4.80

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 .....10.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston S5 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
LosAngeles B3 .....7.625
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy
Bridgeport,Conn. N19 ...6.85
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston S5 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES
Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. C5 ....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon
Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....4.65
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ...4.80
Fontana, Calif. K1 .....5.35
Gary,Ind. U5 .....4.65
Houston S5 .....4.90
Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 .....4.65
Weirton,W.Va. W6 .....4.65
Youngstown R3, U5 ...4.65

BARS, H.R. Leaded Alloy
Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana, Calif. K1 ....6.625
FairlessHills,Pa. U5 ...5.725
Gary,Ind. U5 .....5.575
Houston S5 .....5.825
Ind.Harbor,Ind. I-2,Y1.5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ...5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago R2, U5, W14..5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.90
Bessemer,Ala. T2 .....6.90
Bethlehem,Pa. B2 .....6.90
Clairton,Pa. U5 .....6.90
Cleveland R2 .....6.90
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.90
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.90
Houston S5 .....7.05
Ind.Harb.,Ind. I-2, Y1 ..6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ...6.90
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.90
Seattle B2 .....7.55
S.Chicago W14 .....6.90
S.Duquesne,Pa. U5 ....6.90
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.90
Warren,O. R2 .....6.90
Youngstown U5 .....6.90

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. B2 .....4.90

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston S5 .....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy
Ambridge,Pa. W18 ...8.325
Camden,N.J. P13 .....8.50
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca, Pa. S17 ....8.325
Newark,N.J. W18 ....8.50
SpringCity,Pa. K3 ....8.50
Warren,O. C17 .....8.325

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2 5.90
Buffalo B5 .....5.95
Camden,N.J. P13 .....6.35
Carnegie,Pa. C12 .....5.90
Chicago W18 .....5.90
Cleveland A7, C20 ....5.90
Detroit R7 .....5.90
Detroit B5, P17 .....6.10
Donora,Pa. A7 .....5.90
Elyria,O. W18 .....5.90
FranklinPark,Ill. N5 ...5.90
Gary,Ind. R2 .....5.90
GreenBay,Wis. F7 .....5.90
Hammond,Ind. L2, M13.5.90
Hartford,Conn. R2 ....6.40
Harvey,Ill. B5 .....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ....5.90
Midland,Pa. C18 .....5.90
Monaca,Pa. S17 .....5.90
Newark,N.J. W18 .....6.35
NewCastle,Pa.(17) B4 ..5.90
Pittsburgh J5 .....5.90
Plymouth,Mich. P8 ....6.15
Putnam,Conn. W18 ....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 ....5.90
SpringCity,Pa. K3 ....6.35
Struthers,O. Y1 .....5.90
Waukegan,Ill. A7 .....5.90
Worcester,Mass. W19 ...6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md. C19 ...5.15

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.60
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 ....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. F7 .....7.425
Hammond,Ind. L2, M13..7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5 ....7.725
Massillon,O. R2, R8 ....7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P8 ....7.625
S.Chicago W14 .....7.425
SpringCity,Pa. K3 .....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.425
Waukegan,Ill A7 .....7.425
Worcester,Mass. A7 ....7.725
Youngstown F3, Y1 ....7.425

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 .....4.65
Atlanta A11 .....4.85
Birmingham C15 .....4.65
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Ft. Worth,Tex.(42) T4 ...5.10
Gary,Ind. U5 .....4.65
Houston S5 .....4.90

Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 ....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 ....5.35
Milton,Pa. M15 ....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.00
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 ....5.40
S.Chicago R2 ....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1.4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 ....5.90
Pittsburgh U5 ....6.17
Seattle B3, N14 ....6.60
SparrowsPt. ¼-1" B2 ..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

Avis,Pa.(3) J5 ....4.25
ChicagoHts.(3) C2, I-2..4.85
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..4.95
Franklin,Pa.(3) P5 ....4.55
Franklin,Pa.(4) P5 ....4.65
Marion,O.(3) P11 ....4.50
Moline,Ill.(3) R2 ....4.65
Tonawanda(3) B12 ....4.50
Tonawanda(4) B12 ....4.65
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 ....4.325
Allenport,Pa. P7 ....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 ....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 ....4.425
Fairfield,Ala. T2 ....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 ....4.325
Geneva,Utah C11 ....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1.4.325
Kokomo,Ind. C16 ....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 ....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. N12 ....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 ....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 ....4.325
Sharon,Pa. S3 ....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2..4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 ....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ....5.625
Kokomo,Ind. C16 ....5.675
Niles,O. N12 ....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 ....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 ....6.475
Fairfield,Ala. T2 ....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind. U5 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
Sharon,Pa. S3 ....6.375
S.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 ....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.875
Cleveland R2 ....4.925
Ind.Harbor,Ind. I-2 ...4.875
Warren,O. R2 ....4.925

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 ....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 ....5.325
Ecorse,Mich. G5 ....5.425
Fairfield,Ala. T2 ....5.325
FairlessHills,Pa. U5 ...5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.426
Gary,Ind. U5 ....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 ....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 ....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 ....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 ....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 ....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 ....7.975
FairlessHills,Pa. U5 ...7.925
Fontana,Calif. K1 ..8.975
Gary,Ind. U5 ....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 ....7.875
SparrowsPoint(38) B2.7.875
Warren,O. R2 ....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 ....7.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ....5.925
Middletown,O. A10 ....5.825
Warren,O. R2 ....5.925

SHEETS, Culvert

(16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10	6.00	...
Canton,O.	R2	6.10	6.55
Dravosburg	U5	6.10	...
Cleveland	R2	6.10	...
Gary,Ind.	U5	6.10	6.35
Ind.Harbor	I-2	6.10	6.35
Kokomo,Ind.	C16	6.20	...
MartinsFry.	W10	6.10	...
Newport,Ky.	N9	6.10	6.35
Pitts.,Calif.	C11	6.55	...
SparrowsPt.	B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ....7.15
Gary,Ind. U5 ....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 ....5.85†
Ashland,Ky. A10 ....5.85†
Canton,O. R2 ....5.85†
Delphos,O. N16 ....6.00†
Dover,O. R1 ....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 ....5.85†
Gary,Ind. U5 ....5.85°
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 ....5.90†
MartinsFerry,O. W10 ..5.85°
Middletown,O. A10 ....5.85†
Newport,Ky. N9 ....5.85†
Niles,O. N12 ....6.85‡
Pittsburg,Calif. C1 ....6.60°
SparrowsPt.,Md., B2 ..5.85†
Steubenville,O. W10 ...5.85‡
Warren,O. R2 ....5.85†
Weirton,W.Va. W6 ....5.85°

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.875

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.00
SparrowsPoint(39) B2 ..8.00

SHEETS, Galvannealed Steel

Canton,O. R2 ....6.35
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 ....6.00
Newport,Ky. N9 ....6.25
Niles,O. N12 ....7.35

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 ....6.10
Canton,O. R2 ....6.00
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ....6.70
Niles,O.(28) R2 ....6.70
Weirton,W.Va. W6 ....6.85

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.80
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ....5.90
Cleveland R2 ....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 ....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 ....5.90
Youngstown Y1 ....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ...7.75
Yorkville,O. W10 ....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeachBottom,W.Va. W10 6.25
Gary,Ind. U5 ....6.25
Mansfield,O. E6 ....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 ....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelson Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T12 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	..4.325
Allenport,Pa. P7	.....4.325
Alton,Ill. L1	.....4.50
Ashland,Ky.(8) A10	..4.325
Atlanta A11	.....4.525
Bessemer,Ala. T2	....4.325
Birmingham C15	....4.325
Bridgeport,Conn. N19	..4.625
Buffalo(27) R2	.....4.325
Conshohocken,Pa. A3	..4.375
Detroit M1	.....4.425
Ecorse,Mich. G5	.....4.425
Fairfield,Ala. T2	....4.325
Fontana,Calif. K1	....5.075
Gary,Ind. U5	.....4.325
Ind.Harbor, Ind.I-2, Y1	4.325
Johnstown,Pa.(25) B2	..4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	....5.075
Milton,Pa. M18	.....4.325
Minnequa,Colo. C10	..5.425
NewBritain(10) S15	...4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	..5.075
Portsmouth,O. P12	....4.325
Riverdale,Ill. A1	.....4.325
SanFrancisco S7	.....5.06
Seattle(25) S3	.....5.325
Seattle N14	.....5.40
Sharon,Pa. S3	.....4.325
S.Chicago,Ill. W14	..4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	..4.325
Sterling(1) N15	.....4.325
Sterling,Ill. N15	.....4.425
Torrance,Calif. C11	..5.075
Warren,O. R2	.....4.325
Weirton,W.Va. W6	....4.325
Youngstown U5	.....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	..7.50
Carnegie,Pa. S18	.....7.20
Fontana,Calif. K1	....8.85
Gary,Ind. U5	.....7.20
Ind.Harbor,Ind. Y1	....7.20
LosAngeles B3	.....8.40
Newport,Ky. N9	.....7.20
Sharon,Pa. S3	.....7.20
S.Chicago W14	.....7.20
Youngstown U5, Y1	....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	.°..6.425
Conshohocken,Pa. A3	..6.425
Ecorse,Mich. G5	.....6.525
Fairfield,Ala. T2	....6.425
Fontana,Calif. K1	....7.525
Gary,Ind. U5	.....6.425
Houston S5	.....6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	....6.675
Lackawanna,N.Y. B2	..6.425
LosAngeles(25) B3	....7.175
Seattle(25) B3	.....7.425
Sharon,Pa. S3	.....6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	..6.425
Warren,O. R2	.....6.425
Weirton,W.Va. W6	....6.425
Youngstown U5, Y1	..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	..4.575
Warren,O. R2	.....4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. U6	.....6.25
Baltimore T6	.....6.25
Boston T6	.....6.80
Buffalo S40	.....6.25
Cleveland J5	.....6.25
Cleveland A7	.....6.25
Conshohocken,Pa. A3	....6.30
Dearborn,Mich. D3	.....6.35
Detroit D2, M1, P20	....6.35
Dover,O. G6	.....6.25
Ecorse,Mich. G5	.....6.35
Follansbee,W.Va. P4	....6.25
Fontana,Calif. K1	.....8.00
FranklinPark,Ill. T6	....6.35
Ind.Harbor,Ind. I-2	....6.35
Ind.Harbor,Ind. Y1	....6.25
Indianapolis C8	.....6.40
Lackawanna,N.Y. B2	..6.25
LosAngeles C1	.....8.50
NewBedford,Mass. R10	..6.70
NewBritain(10) S15	...6.25
NewCastle,Pa. B4, E5	..6.25
NewHaven,Conn. A7	....7.00
NewHaven,Conn. D2	....6.70
NewKensington,Pa. A6	..6.25
Pawtucket,R.I. R3	....6.90
Pawtucket,R.I. N8	....6.80
Pittsburgh J5	.....6.25
Portsmouth,O. P12	....6.25
Riverdale,Ill. A1	.....6.35
Rome,N.Y.(32) R6	....6.25
Sharon,Pa. S3	.....6.25
SparrowsPt.,Md. B2	....6.25
Trenton,N.J.(31) R5	...7.80
Wallingford,Conn. W2	..6.70
Warren,O. R2, T5	.....6.25
Weirton,W.Va. W6	....6.25
Worcester,Mass. A7	....7.10
Youngstown Y1	.....6.25
Youngstown C8	.....6.25

STRIP, Cold-Rolled Alloy

Boston T6	.....13.80
Carnegie,Pa. S18	.....13.45
Cleveland A7	.....13.45
Dover,O. G6	.....13.45
FranklinPark,Ill. T6	...13.45
Harrison,N.J. C18	....13.45
Indianapolis C8	.....13.60
Pawtucket,R.I. N8	...13.80
Sharon,Pa. S3	.....13.45
Worcester,Mass. A7	...13.75
Youngstown C8	.....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	.....9.10
Dearborn,Mich. D3	....9.20
Dover,O. G6	.....9.30
Ecorse,Mich. G5	.....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	....
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. P4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
New York W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.00	....
Buffalo W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	15.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.25

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.00*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	....	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-58	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.55	17.45	17.95	13.55‡
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.55	15.55	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ‖Coils, ¾-cent higher.

STRIP, Electrogalvanized

Cleveland A7	.....6.25*
Dover,O. G6	.....6.25*
Riverdale,Ill. A1	.....6.55*
Youngstown C8	.....6.25*
Warren,O. T5	.....6.25*
Warren,O. B9	.....6.45*
Weirton,W.Va. W6	....5.75*
Worcester,Mass. A7	...7.10*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	.....6.55

TIGHT COOPERAGE HOOP

Atlanta A11	.....5.05
Riverdale,Ill. A1	.....4.90
Sharon,Pa. S3	.....4.75
Youngstown U5	.....4.75

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.575	....	....
Niles,O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Warren,O. R2	9.20	9.45
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	..6.25
Aliquippa,Pa. J5	.....6.25
Alton,Ill. L1	.....6.425
Atlanta A11	.....6.45
Bartonville,Ill. K4	....6.35
Buffalo W12	.....6.25
Chicago W13	.....6.25
Cleveland A7	.....6.25
Crawfordsville,Ind. M8	..6.35
Donora,Pa. A7	.....6.25
Duluth,Minn. A7	.....6.25
Fairfield,Ala. T2	.....6.25
Fostoria,O.(24) S1	....6.45
Houston S5	.....6.50
Jacksonville,Fla. M8	..6.77
Johnstown,Pa. B2	.....6.25
Joliet,Ill. A7	.....6.25
KansasCity,Mo. S5	....6.50
Kokomo,Ind. C16	.....6.35
LosAngeles B3	.....7.20
Minnequa,Colo. C10	....6.50
Monessen,Pa. P7	.....6.25
Newark 6-8 ga. I-1	....6.90
N.Tonawanda B11	....6.25
Palmer,Mass. W12	....6.55
Pittsburg Calif. C11	...7.20
Portsmouth,O. P12	....6.25
Rankin,Pa. A7	.....6.25
S.Chicago,Ill. R2	.....6.25
S.SanFrancisco C10	....7.20
SparrowsPoint,Md. B2	..6.35
Sterling,Ill.(1) N15	....6.25
Sterling,Ill. N15	.....6.35
Struthers,O. Y1	.....6.25
Waukegan,Ill. A7	.....6.25
Worcester,Mass. A7	....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	.....7.90
Alton,Ill. L1	.....8.075
Bartonville,Ill. K4	.....8.00
Buffalo W12	.....7.90
Cleveland A7	.....7.90
Donora,Pa. A7	.....7.90
Duluth,Minn. A7	.....7.90
Fostoria,O. S1	.....7.95
Johnstown,Pa. B2	.....7.90
LosAngeles B3	.....8.55
Millbury,Mass.(12) N6	..8.20
Minnequa,Colo. C10	....8.15
Monessen,Pa. P16	.....7.90
Muncie,Ind. I-7	.....8.10
Palmer,Mass. W12	.....8.20
Pittsburg,Calif. C11	...8.85
Portsmouth,O. P12	....7.90
Roebling,N.J. R5	.....8.20
S.Chicago,Ill. R2	.....7.90
S.SanFrancisco C10	....8.55
SparrowsPt.,Md. B2	..8.00
Struthers,O. Y1	.....7.90
Trenton,N.J. A7	.....8.20
Waukegan,Ill. A7	.....7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	.....7.60
Alton,Ill. L1	.....7.775
Buffalo W12	.....7.60
Cleveland A7	.....7.60
Donora,Pa. A7	.....7.60
Duluth,Minn. A7	.....7.60
Johnstown,Pa. B2	.....7.60
KansasCity,Mo. S5	....7.85
LosAngeles B3	.....8.55
Minnequa,Colo. C10	...7.775
Monessen,Pa. P16	....7.60
NewHaven,Conn. A7	..7.90
Palmer,Mass. W12	....7.90
Pittsburg,Calif. C11	..8.55
Portsmouth,O. P12	....7.60
Roebling,N.J. R5	.....7.90
S.Chicago,Ill. R2	.....7.60
S.SanFrancisco C10	....8.55
SparrowsPoint,Md. B2	..7.70
Struthers,O. Y1	.....7.60
Trenton,N.J. A7	.....7.90
Waukegan,Ill. A7	.....7.60
Worcester,Mass. A7	....7.90

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	.....12.725
Bartonville,Ill. K4	....12.65
Buffalo W12	.....12.55
Chicago W13	.....12.55
Cleveland A7	.....12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	.....12.55
Jacksonville,Fla. M8	..13.05
Johnstown,Pa. B2	....12.55
Kokomo,Ind. C16	.....12.55
Minnequa,Colo. C10	....12.30
Monessen,Pa. P16	....12.55
Muncie,Ind. I-7	.....12.75
Palmer,Mass. W12	.....12.85
Roebling,N.J. R5	....12.85
S.SanFrancisco C10	....12.90
Waukegan,Ill. A7	....12.55
Worcester,Mass.A7,T6	.12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	....10.70
Buala W12	.....10.70
Johnstown,Pa. B2	....10.70
Minnequa,Colo. C10	..10.625
Monessen,Pa. P16	....10.70
Muncie,Ind. I-7	.....10.90
Pittsburg,Calif. C11	..11.50
Portsmouth,O. P12	....10.70
Roebling,N.J. R5	....11.00
SparrowsPt.,Md. B2	...10.80

ROPE WIRE (A)

Bartonville,Ill. K4	....10.55
Buffalo W12	.....10.55
Fostoria,O.(23) S1	....10.55
Johnstown,Pa. B2	....10.55
Monessen,Pa. P16	....10.55
Muncie,Ind. I-7	.....10.75
Palmer,Mass. W12	....10.85
Portsmouth,O. P12	....9.75
Roebling,N.J. R5	....10.85
SparrowsPt. B2	.....10.65
Struthers,O. Y1	.....10.55
Worcester,Mass. J4	....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.43
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.13
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.60

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172‡
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	179*
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 Ga. Col.

Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	281**
Aliq'ppa,Pa.9-14½ga J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166*
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166*

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.60	16.50
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.50	16.50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,Mass W12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.50	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925‡
Atlanta A11	7.50	8.075
Bartonville(43) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	
Crawfordsville M8	7.50	8.075
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla. M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	7.975*
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.35	8.75†
Portsmouth,O. P12	7.40	
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ling(1)(48)	N15 7.40	8.00††
Struthers,O.(48)	Y1 7.40	7.90‡
Worcester,Mass.	A7 7.70	

*Based on 12.50c zinc; †8c zinc; ‡10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	173
Atlanta A11	175
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth,Minn. A7	173
Fairfield,Ala. T2	173
Joliet,Ill. A7	173
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
S.Chicago R2	173
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	175
Sterling,Ill.(1) N15	173

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, less case lots, per cent off list, f.o.b. midwestern plants)

4" and shorter:
- ½" & smaller diam. ... +5

Over 4" through 6":
- ½" and smaller diam. +12

6" and shorter:
- ⅝" and ¾" ... +13
- ⅞" and larger ... +16

Longer than 6":
- All diameters ... +25

Lag bolts, all diams:
- 6" and shorter ... +2
- Over 6" long ... +11

Ribbed Necked Carriage ... +13
Blank ... 2
Plow ... 18
Step, Elevator, Tap and Sleigh Shoe ... 2
Tire Bolts ... 12
Boiler & Fitting-Up Bolts 14

NUTS

H.P. and C.P., regular & heavy:
- Square, all sizes ... 51

H.P., Hex. regular & heavy:
- ¾" and smaller ... 55
- ⅞" to 1⅛", inclusive. 55
- 1¼" to 1½", inclusive 57
- 1⅝" and larger ... 51

C.P. Hex regular & heavy:
- ¾" and smaller ... 55
- Larger than ¾" ... 51

Hot Galv. Nuts (all types):
- ¾" or smaller ... 38
- ⅞" to 1½", inclusive. 36

Finished Hex Nuts:
- ¾" and smaller ... 55
- ⅞" and larger ... 51

Semifinished & Slotted Hex:
- Regular and heavy, ¾" and smaller ... 55
- ⅞" and larger ... 51

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages; plain finish)

3" and shorter:
- ⅛" thru ¼" diam, 25,000 to 200,000 pieces ... 61
- Over 200,000 pieces. 64
- ⅛" thru ¼" diam: 15,000 to 100,000 pieces ... 61
- 100,000 or more ... 64

Longer than 3", any diam:
- 5000 to 100,000 pieces ... 61
- Over 100,000 pieces. 64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under..List less 32½

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.41
1¼	13	....	24.94	20.44
1½	13	23.31	27.57	22.60
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.59
2¾	12	41.57	49.16	40.31
2⅞	12	45.09	53.22	43.65
3	12	47.99	56.76	46.54

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.65
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	6.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity,Mo. S5	12.40
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R3	7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	15.25
Unannealed: Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh).	21.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-145.00
Aluminum: Atomized, 500 lb drum, frght. allowed Carlots	24.50
Ton lots	26.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000 lb lots	61.50-64.75†
Copper: *Electrolytic*	*59.00*
Reduced	*59.00*
Lead	*24.00*
Manganese: Minus 35 mesh	51.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	58.75-63.75†
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	81.25
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh: 1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Chicago or Birm. base.
(7) To jobbers, 2 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5 sqc.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.10c.
(27) Bar mill sizes.
(28) Rodenhiser.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 6.60c for cut lengths.
(35) 12" and narrower.
(36) 14" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 46" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 6.15c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 6.25c.
(43) 9-14½ Ga.
(46) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.46		$1.92	
Pounds Per Ft	3.65		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	...	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		⅝		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+13	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. P6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	0	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	16.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	37.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	30.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	35.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	39.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	28.50	30.50	....	31.50	....	....	....
431	18.00	20.50	28.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	46.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	68.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	60.15	60.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. C31	60.50	61.00	61.50	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa,deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. R1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.60%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 10%; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	*$81.50*
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T2 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‖	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.05	...	7.61	8.62[9]	13.44	7.93	7.21	8.97
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.25	....	7.38	6.90	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.80	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.60	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.06	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.80	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.40	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.25	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.80	8.18	8.89	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.58
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.65	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.25	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.38	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.09	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.63	7.33	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[5]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.30	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.80	8.79	7.97	....	8.12	...	8.08	9.00	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅜-in. and heavier; ††as annealed; ‖‖under ½-in.
Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—500 to 9999 lb; [5]—400 to 999 lb; [6]—4000 lb and over; [6]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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  The only insulating firebrick on the market designed for such high temperature service.
- **G-30 FOR TEMPERATURES TO 3000° F.**
  A *true* 3000° F. insulating firebrick . . . precise data recorded in actual service proves it to be the outstanding brick of its type.
- **G-28 FOR TEMPERATURES TO 2800° F.**
  Can be used in place of normal fire-clay brick with tremendous savings in weight and fuel costs.
- **G-26 FOR TEMPERATURES TO 2600° F.**
  In many furnaces where the temperature does not exceed 2600° F., G-26 can be used in place of fire-clay brick.
- **G-23 FOR TEMPERATURES TO 2300° F.**
  Unexcelled for use in heat treating and annealing furnaces in which the temperature does not exceed 2300° F.
- **G-20 FOR TEMPERATURES TO 2000° F.**
  Designed primarily as a high temperature backing-up insulation, G-20 can also be used in direct contact with flame and furnace gases.

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• distributors in the principal cities of the world.

In spite of a unique supply problem, producers see . . .

Good Year for Rail Steel

HIGH PRICES and decreasing supplies of raw material are bothering rail steel bar producers, but they still look forward to completing the third best year in the industry's 80-year history.

Shipments in 1955 should fall just 15 per cent below the record set in 1948, says the Rail Steel Bar Association. And 1956 should be just about as good, depending on the extent to which American railroads replace old track. And there is the hitch.

Tight—Rail steel people have had three prime sources of supply: Abandoned mines, lumber trails and regular railroads. Usable track from mines and lumber trails is nearly all gone. And from all indications, railroads aren't replacing tracks at the rate they did five or ten years ago. The American Iron & Steel Institute reports shipments of new rails of all kinds dropped from 2,191,400 tons in 1948 to 1,196,831 tons last year. The first half of this year showed some improvement, but the last half shows further signs of tightening up. Rail steel bar producers say their activities usually lag behind these figures from three to six months, so they anticipate a shortage during first half of next year.

This has led to heavy buying for inventory, which, in turn, is partly responsible for higher prices of scrap rails. Most producers believe the price for old rails is way out of line with other scrap prices. But they also admit that when the price is "right" there is never a shortage of raw materials for them. The industry now has at least a three-month inventory of rails, the largest stocks in over two years.

Unusual Industry—This dependence on the railroads for its raw material has kept the industry from expanding. In fact, in the last ten years, it has slimmed down from 22 to 20 members. There has been no lack of business—most mills are producing as fast as they can get rails and selling all they can produce. But there is no reason to expand if there is no assurance of a steady increase in supplies. This situation has made the rail steel industry one of the most stable in recent years. There hasn't been more than a 150,000-ton difference between the best and worst years in recent history.

The industry began as a producer of fence posts, still one of its major products. In the early 1900s, the emphasis was on reinforcing bars, which represented about 80 per cent of the industry's output until the late 1940s. Then the shift came to specialty items, such as shapes and bars for agricultural implements and metal furniture industries. At present, reinforcing bars account for only 35 to 40 per cent of the product mix.

Feels the Pinch—Because of the specialty nature of hot-rolled rail steel bars, users of mild steel bars seldom come into the market. However, when supply of regular hot-rolled bars from basic steel mills is tight, as it is now, rail steel people feel an increased demand for their product as a substitute. "It really doesn't affect our business too much, though," reports one producer. "After all, we have trouble getting enough raw material to supply our regular customers without taking on new ones."

Some rail steel mills are supplementing their usual raw material supply with high-carbon electric-furnace steel. This seems to be a trend in the industry as rails become harder to get.

The chief selling point for rail steel bars is their high yield strength (between 65,000 and 85,000 psi, versus 35,000 to 50,000 psi for mild steel bars). With rail steel bars, a designer can reduce the weight of his product considerably without reducing its strength and save material costs to boot. The material also has a greater tensile strength than mild steel bars, which is one reason it is used in metal furniture frames.

Stainless Steel . . .

Stainless Steel Prices, Page 146

More producers are taking nickel-bearing grade orders in relation to nickel supply, but they are having difficulty in switching consumer specifications. In the first ten months of this year, mills and warehouses have already passed 1956 volume in flat-rolled and bars.

A Cambridge, Mass., distributor with Baltimore mill connections booked the bulk of stainless plate tonnage, 305 grade, required by a Portland, Me., shop fabricating mine-sweeping equipment for the Navy.

Steel Bars . . .

Bar Prices, Page 142

In accepting tonnage orders for shipment beyond the end of this year, some hot-rolled carbon bar mills are booking only for the first month that will be open in schedules after carry-over orders have been cared for. In certain instances, this means February. Other mills, while accepting business for the entire quarter, will have less than two months of output open for new orders. All available space in rolling schedules for the period is being snapped up rapidly.

Meanwhile, the mills are practically sold out for this quarter on alloy bars, and they are beginning to build up first quarter order loads. On the common grades of cold-drawn bars, where hot stock is available, consumers in New England report they can still place tonnage for delivery by year end. January-February shipment is promised on turned and polished stock. However, the prospec-

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tive carry-over in hot-rolled bars is sufficient to delay first quarter bookings. New England mills that opened books for first quarter are filled up.

While hot-rolled bar consumers are trying to pick up tonnage through warehouses and importers to augment their shipments from the mills, most of them have been unable to get more than enough tonnage to meet minimum requirements.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 143 & 144

While not all sheet producers have definitely set up rolling schedules for the first quarter of next year, all indications point to substantial carry-overs at the end of this year. In most cases, it appears arrearages will amount to at least one month of production in hot and cold-rolled sheets, galvanized sheets and specialties, such as electrical sheets and enameling stock.

This means that consumers are not likely to be able to place orders for more than two months of production next quarter.

Pittsburgh district makers are waiting to see how large their carry-over will be at year end before opening first quarter books. Some integrated mills are concentrating on production of cold rolled, because it is a profitable item, and also because it meets heavy demands from auto builders and makers of appliances. Auto builders have returned to the market in strength.

No year end lull in demand is in prospect in the Midwest. Consumers are expected to push for every ton they can get. For some producers, hot-rolled supply is equally as tight as cold rolled. Wider widths are particularly troublesome. Requirements for galvanized sheets may taper a bit seasonally.

Shipments of cold rolled to New England consumers are heavier and are in excess of the tonnage booked for this quarter. These shipments are largely against orders placed for third quarter delivery—some even for second quarter.

Certain New England consumers are taking in more tonnage than they are using, with the result that the drag on their inventories is notice-

Shipments of Steel Products—August, 1955

(All Grades; Net Tons)

Products	Carbon	Alloy	Stainless	Total Eight Months 1955	1954
Ingots	34,706	13,348	1,920	378,115	229,220
Blooms, slabs, etc.	181,476	49,482	1,966	1,853,325	970,444
Skelp	15,888	.....	.....	114,776	79,274
Wire rods	97,194	2,024	523	757,791	506,717
Total semifinished	329,264	64,854	4,409	3,104,007	1,785,655
Structurals	374,507	3,812	1	3,006,173	3,132,702
Steel piling	32,495	.....	.....	246,663	264,966
Plates	513,393	27,705	2,176	4,219,736	3,697,453
Rails—standard	79,135	.....	.....	829,354	924,326
Rails—other	9,101	.....	.....	51,125	61,345
Joint bars	5,965	.....	.....	45,186	54,852
Tie plates	18,046	.....	.....	216,804	197,586
Track spikes	7,247	.....	.....	65,364	53,250
Wheels	25,545	64	.....	192,451	134,420
Axles	9,869	31	.....	71,862	40,812
Total railroad	154,908	95	.....	1,475,146	1,466,591
Bars—hot rolled	534,225	178,556	3,921	5,653,426	4,058,996
Bars—reinforcing	197,373	.....	.....	1,388,150	1,187,332
Bars—cold drawn	127,679	28,991	4,613	1,208,506	781,501
Tool steel	1,100	7,894	.....	73,624	56,665
Total bars	860,377	212,471	8,534	8,323,706	6,084,494
Standard pipe	264,372	4	.....	1,941,245	1,537,397
Oil country goods	170,205	32,729	.....	1,634,650	1,624,208
Line pipe	315,133	30	.....	1,986,196	1,943,825
Mech. tubing	54,385	34,200	383	617,411	447,168
Pressure tubing	20,284	2,245	1,097	175,300	194,572
Total pipe	824,378	69,200	1,480	6,354,810	5,747,170
Wire—drawn	261,868	3,561	2,893	2,076,215	1,568,497
Nails & staples	55,893	.....	.....	464,913	398,034
Wire—barbed	8,698	.....	.....	98,813	106,014
Woven fence	20,100	.....	.....	247,676	232,572
Bale ties	5,121	.....	.....	49,975	42,951
Total wire	348,588	3,561	2,893	2,935,592	2,338,068
Black plate	65,458	.....	.....	528,636	455,585
Tin plate HD	111,482	.....	.....	799,480	939,677
Tin plate elec.	441,201	.....	.....	3,278,633	2,663,943
Total tin	618,141	.....	.....	4,606,749	4,059,205
Sheets—hot rolled	742,677	31,436	2,933	6,154,289	3,865,570
Sheets—CR	1,162,522	3,912	12,947	9,739,676	6,089,573
Sheets—gal.	241,863	.....	.....	1,818,135	1,542,618
Sheets—other	22,709	.....	.....	175,186	112,882
Sheets—enameling	19,104	.....	.....	141,111	109,625
Electrical sheet and strip	8,569	58,546	.....	514,871	389,463
Strip—HR	157,946	3,402	450	1,374,967	944,186
Strip—CR	115,380	1,350	20,636	1,103,646	815,730
Total sheets and strip	2,470,761	98,646	36,966	21,021,775	13,869,647
Total shipments	6,527,112	470,344	56,159	55,294,356	42,445,951

ably less. Consumers' inventories are being watched closely, but so far there has been little evidence of overbuying.

Tin Plate . . .

Tin Plate Prices, Page 144

Shipments of metal cans in the first eight months of this year were substantially ahead of those in the corresponding period of 1954. The movement amounted to 2,940,555 tons, compared with 2,766,668, according to the Census Bureau. August shipments totaled 564,154 tons, against 427,434 in July and 522,293 in August a year ago.

The fruit and vegetable pack (including juice) was 927,286 tons for the first eight months. This compares with 859,862 in the like period last year. The August total was 276,080 tons, compared with 167,177 in July and 272,448 in August, 1954.

Installation of a second continuous electrolytic tinning mill is planned by the Dominion Foundries & Steel Ltd., Hamilton, Ont.

Wire . . .

Wire Prices, Pages 144 & 145

Demand for manufacturers wire in all grades continues without letup. Carbon grades for automobile springs are notably active.

There will be some carry-over from the fourth quarter, but, as a general thing, wiremakers are not too far off on their delivery promises. The bulk of the delinquent tonnage is held by New England mills that were set back by flood damage.

Rope wire buying is heavier, stimulated by government orders. Shipment has moved out generally to 75 days. Rod mill capacity is taken into January-February, but some easing in supply will follow return to production of one Buffalo district unit with increased capacity.

Merchant wire trade is seasonally off. Flood damage didn't require as much wire for repairs in New England and the East as had been expected. Emergency wire requirements leveled off eastern stocks somewhat, however, so demand should be stronger than normal next year. In fact, jobber requirements generally are expected to pick up within a month with the warehouses beginning to order for 1956 farm requirements.

Currently, domestic producers of merchant products are meeting increasing competition from imported steel. The competition is especially noticeable in fencing and nails, particularly in the Midwest.

The increase in the price of zinc to 13.50 cents may be reflected in

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an advance in galvanized wire shortly where pricing is tied to fluctuations in the coating metal.

Plates . .

Plate Prices, Page 142

Consumers are pushing mills hard for tonnage. While they are reconciled to the fact they will not be able to place additional orders with their regular suppliers for delivery the remainder of the current quarter, they are pressing for information as to where they stand for first quarter. Few of the mills are in position to tell them.

Indications are that tonnage in the first three months of next year will be spread out even thinner than it was during the current quarter. No increase in production seems likely, and railroad equipment builders and the shipyards, particularly the former, will be sharing in available supply in much greater degree than at present.

New England fabricating shops are placing first quarter orders with difficulty. At least they are not able to place the volume they would like. Although considerable mill capacity is open for the period, bookings are being limited, based largely on past consumer order pattern. Procurement is most difficult with those shops accepting new fabricating contracts taking tonnage in excess of their historic pattern and requiring definite delivery time for completion.

Prospects for supply relief are dim at Pittsburgh. Mills in that area are one to two months behind on shipments. It is understood they will blank out at least one month of first quarter production to care for indicated carry-over.

In the Midwest, strong activity in the heavy industries, including construction, machinery, pipelines, tanks and freight cars, keeps plates in the tightest supply category of all steel products. This year it appears seasonal factors, which normally reduce consumption in the fourth and first quarters, will have little influence. Sheared plates are tighter than universal.

Structural Shapes . . .

Structural Shape Prices, Page 142

Structural work in the New York metropolitan area is leveling off, if not dipping. Demand is still heavy, however, and, considering work in adjacent areas, such as the Connecticut state road building program now getting under full swing, much business is in prospect along the northeastern seaboard.

Fabricators emphasize that their concern is not so much the volume of new work in prospect as it is over getting structural steel to meet commitments. They are not getting all the tonnage promised them by the mills this quarter and they are worried about what will happen in first quarter. To date, the leading shape producers haven't opened their books for first quarter.

Shipments of structurals are about two months behind schedule at Pittsburgh, with wide-flange beams in particularly tight supply. The steel shortage is holding up some construction and also is affecting the building of barges and the fabricating of pipe lines.

In the Midwest, construction work under way and in various stages of planning assures strong demand for structurals this quarter and next. The emphasis is on wide-flange sections. Inland Steel Co.'s new wide flange facilities are undergoing run-in operations, but they won't be providing much tonnage before early 1956.

Fabricated structural prices are higher in New England, averaging $25-$30 per ton over those in the first half of this year.

A heavy tonnage of bridge steel

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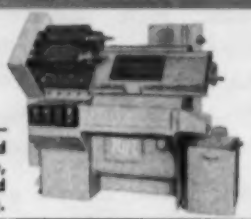

EXHIBIT B

POPE 1 HP, TOTALLY ENCLOSED 3600 RPM MOTORIZED, CARTRIDGE TYPE PRECISION SPINDLES with double row cylindrical roller bearings and separate thrust bearings for no endwise movement of the shaft

EXHIBIT D

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EXHIBIT F

POPE HEAVY DUTY VEE-BELT DRIVEN, PRECISION MILLING SPINDLES, and Wheel Heads, ½ to 50 HP

EXHIBIT G

POPE INTERNAL GRINDING SPINDLES for Cincinnati, Norton, Landis and Heald Grinders and Springfield Vertical Grinders

EXHIBIT C

POPE HIGH SPEED VERTICAL OR HORIZONTAL ATTACHMENTS for 6" x 18" surface grinders at 15,000 RPM

EXHIBIT E

POPE SUPER-PRECISION MOTORIZED TOOL AND CUTTER GRINDER SPINDLES with clearance Angle Swiveling Heads for Angular Adjustment in A Vertical Plane

EXHIBIT H

POPE SUPER-PRECISION HIGH FREQUENCY HEAVY DUTY GRINDING AND MILLING SPINDLES for speeds up to 100,000 RPM

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No. 105

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is building up in New England. Contracts against 24,500 tons for Connecticut are being placed. The bulk of the 175,000 tons required for that state's turnpike will be fabricated in second quarter, 1956.

Tubular Goods . . .

Tubular Goods Prices, Page 146

Demand for oil country goods continues to surpass expectations. Indications are the seasonal decline in winter shipments will not be so severe as usual. Meanwhile, producers are mapping plans for a substantial pickup in sales this coming spring. Some Pittsburgh mills are already taking orders for April and May delivery.

Merchant pipe is one of the few tubular products which can be ordered for delivery in late fourth quarter. The tube mills could fill their books for this quarter on the strength of present demand, but their policy is to sell for only one month ahead. Consequently, the backlog of delayed deliveries is light.

Only on seamless pipe are New England distributors seriously concerned over mill shipments. Producers are booked well into the first quarter, and some of them are three to four weeks behind schedule on shipments. Buttweld pipe, including galvanized, is available in four to five weeks. One eastern mill has reduced production of 10 and 12-in. electricweld pipe, in effect withdrawing from the market on those sizes. Other producers are selling on an f.o.b. mill basis and are not equalizing freight on shipment of these sizes into New England.

Warehouse . . .

Warehouse Prices, Page 147

Tight supply conditions continue to cut into distributors' sales. Each firm can take only part of the inquiries it receives from fabricators. Buyers generally must inquire at two or three warehouses before filling a mixed order. In many districts, warehouse stocks are only 60 to 65 per cent of normal.

Distributors are receiving a growing number of large orders which normally would be placed with mills. They are reluctant to fill these, preferring to service regular customers.

Because consumers are willing to accept more substitute specifications, distributors believe they will be able to maintain daily volume this month at the September level. They continue to have difficulty getting tonnage from the mills in the volume promised and are not able to increase sales.

Jones & Laughlin Steel Corp., Pittsburgh, acquired a new warehouse building in Detroit. It contains 96,000 sq ft for stocking several thousand tons of general steel products.

Semifinished Steel . . .

Semifinished Prices, Page 142

U. S. Steel Corp. is installing facilities for producing high grade alloy and forging quality steels by the "big-end-up hot top" process at its Ohio Works in Youngstown.

The process uses special molds with insulated tops which slow down cooling.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 145

For the first time, high strength bolts and nuts are being substituted for rivets in skyscraper construction (the 22-story Sheraton hotel) in Philadelphia. Local building code was revised this month to make the switch possible.

The Sheraton will require about 4000 tons of structural steel.

Riveting and welding still account for possibly 85 per cent of all building construction, but bolting has been steadily making headway.

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (21-23% Mn) Carlot per gross ton $90.50, Palmerton, Pa.
(19-21% Mn, 1-3% Si), Carlot per gross ton $88, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $86 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese. (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 5.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-83%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 46.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-69%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 16-17.5%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 35-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr; 0.03 max 30.50c, 0.05 max 29c, 0.06 max 28.50c, 0.1 max 34c, 0.15 max 35.75c, 0.2 max 35.50c, 0.5 max 35.25c, 1.0 max 34c, 1.5 max 33.85c, 2.0 max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 26-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 19.4c per lb of alloy, ton lot 20.85c; less ton lot, 23.05c, delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max) Contract, cariot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 58c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.23 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.46c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg., Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boresil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets, 13.5c; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallet, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67, delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 5% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, deld.; less ton lots $4.70.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed, ⅛" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Deld. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 9-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal, Fe). Lump, carload, bulk 16.50c, Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

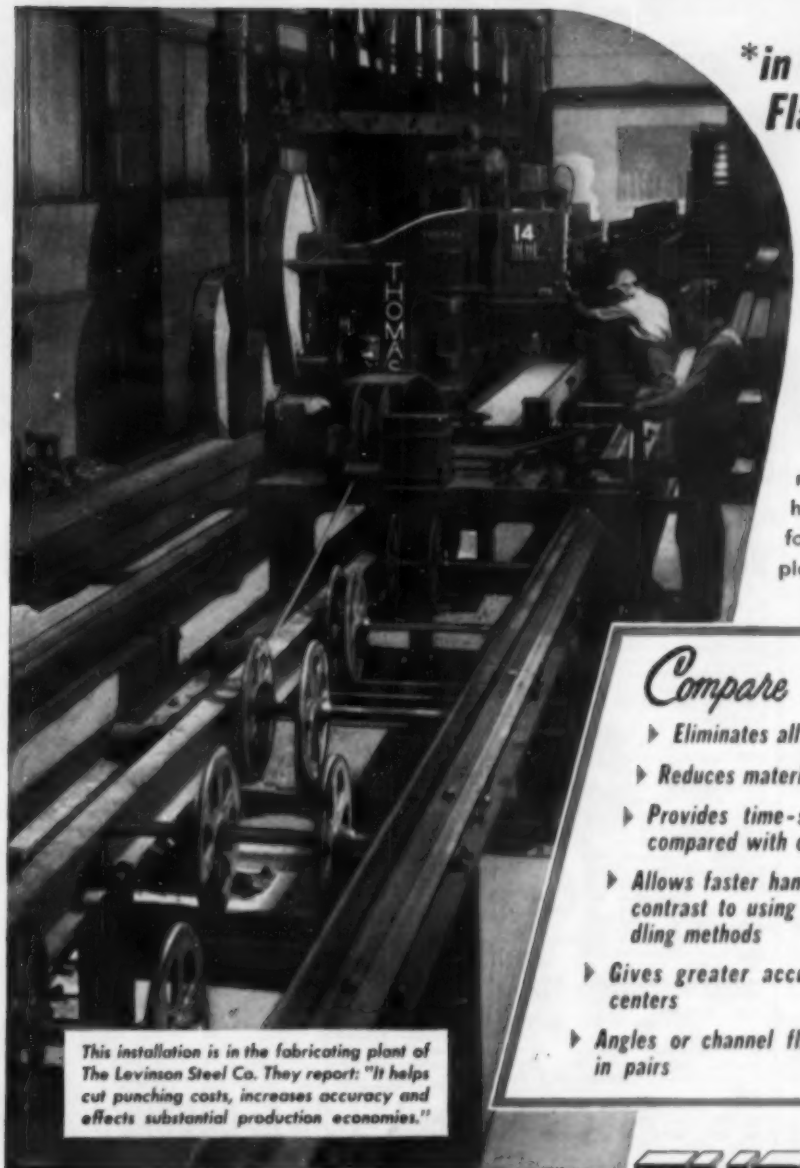
Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Elgio, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa. $1.24.

576 holes punched*

in 25 minutes – without layout!



This installation is in the fabricating plant of The Levinson Steel Co. They report: "It helps cut punching costs, increases accuracy and effects substantial production economies."

*in the web of a 24" Wide Flange Beam 40 ft. long

An Eastern Fabricator used this 225-ton Beam Punch with Motorized Indicator Spacing Table to meet a very special punching problem. His requirements were for the maximum number of punchings in minimum time on a 24-inch wide flange beam forty feet long.

This Thomas combination, requiring no layout, solved his problem. It can help you, too, as proved by the performance records of machines in the plants of other important fabricators.

Compare these Advantages...

- *Eliminates all layout and marking*
- *Reduces material handling*
- *Provides time-saving multiple punching as compared with ordinary single hole punching*
- *Allows faster handling through the punch, in contrast to using jib cranes and other handling methods*
- *Gives greater accuracy than punching to centers*
- *Angles or channel flanges may be handled in pairs*

44

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STEEL SHOT & GRIT CO., BOSTON, MASSACHUSETTS

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.60

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 65-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$34.50-$35.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	32.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $135; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244; Philadelphia, $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Blocks (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $155.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.30; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Erie, Pa., ovens	25.00
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 14.00; Grade 2-3, 13.50; Grade 4, 15.50; Grade 5, 14.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

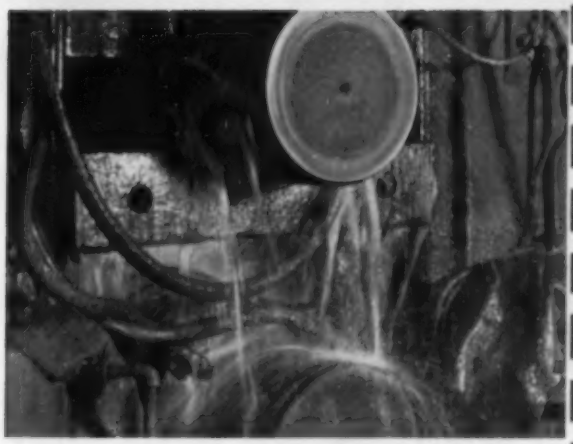
GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Extreme pressure won't budge these HOUGHTON Lubricants!



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HOUGHTO-GEAR E. P. OILS

Today's high-production equipment demands the extra protection and durability of Heavy Duty Houghto-Gear E. P. Oils. For these oils—extreme pressure treated—stand up under loads impossible for standard oils. That's because *Houghto-Gear* oil is fortified for extra high film strength. Moreover, its ability to cling securely to metal surfaces means your equipment will run longer with greater safety.

Your Houghton Man will be glad to make recommendations of these two Houghton Lubricants for your particular needs. Get in touch with him or write to E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

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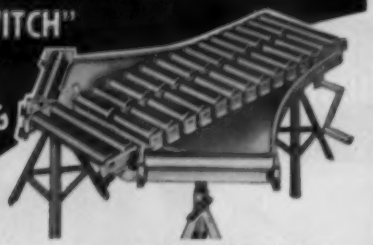

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Two Way "Flex-A-Switch" at right used with 45° curve to effect a 90° turn, and with electric control (extra). Manual control is standard.

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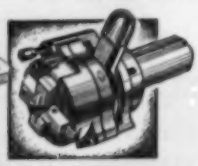

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Scrap . . .

Scrap Prices, Page 160

Pittsburgh—Rumor has it that the largest local buyer plans to place a large order for No. 1 heavy melting scrap within the next week. These reports are unsubstantiated by purchasing agents, but most trade sources expect increased buying of scrap in the next month. General opinion is that purchases will be made at present prices. Railroad lists brought prices averaging $1 a ton higher last week. Railroad scrap is now one of the strongest features of the market here.

Buffalo—Dealers continue to ship against old orders at prices recently established. There is little new buying but one large district steelmaker is expected to enter the market within the week. Supplies are moderate.

Boston—Steel scrap prices are firm but generally unchanged, with shipments against orders to eastern Pennsylvania holding up in good volume. Machine shop turnings are slightly higher at $20-$20.50.

Brokers have advanced buying prices on 18-8 stainless sheets, clips and solids to $290-$300; on the 430 type of sheets, clips and solids, to $120-$125.

New York—Scrap brokers have advanced buying prices on No. 1 bundles to $41-$42, and on No. 1 cupola to $36-$37. Otherwise, the market is unchanged but strong, with business brisk.

Philadelphia — The Fairless Hills, Pa., consumer has purchased a relatively small tonnage of No. 2 bundles at $38, delivered, off $1 from its previous purchase a few weeks ago. This brings the general market to a range of $37-$38, delivered.

Prime grades of open-hearth steel are strong, however, with steady pressure from foreign as well as domestic buyers. Couplers, springs and wheels are higher at $51-$52, delivered, and malleable at $59.

Cincinnati—The local scrap market is quiet. Material is flowing to the mills in volume against previously placed orders. Slight indications of weakness are present, but they are not considered significant.

Detroit — The market in general continues quiet, with some softness in short turnings. Short shovel turnings are quoted at $25, charging box cast at $33 and No. 1 cupola cast at $40.

Chicago—Although consumption of scrap holds steady as steelmaking stands pegged 2 to 3 points below 100 per cent of capacity, the market displays a softer tone. One mill has offered to buy leading grades at $2 a ton below prevailing prices.

St. Louis—The scrap market here has settled down. Demand is relatively inactive, and prices are steady.

Birmingham — Open-hearth scrap, except No. 2 bundles, advanced last week when the district's largest buyer returned to the market. Electric furnace and specialty items also went up. Railroad scrap held steady, as did the cast iron grades.

Los Angeles—Some scrap dealers are disturbed by reports that increased shipments of offshore material are arriving.

San Francisco — Steel scrap continues in strong demand. Prices are unchanged at the recently established higher levels.

Seattle—The steel scrap market is unsettled. Cast iron items are firm but less strong than steel. While $39.50 and $35.50 are quoted on No. 1 and No. 2 heavy melting steel, respectively, sales of No. 1 are reported at $43. Dealers are not selling electric furnace material at the published $50 level.

Consumers are paying truckers above quoted levels. The situation

(*Please turn to page* 162)

Steel Pinch Spurs Imports

Increasing shortage of steel is causing domestic consumers to turn more to importers for tonnage to supplement needs. Consumers are not able to obtain much in the way of plates, sheets or beams, but are having better luck on deformed bars, structural angles, bar size angles and merchant bars, among the major items.

Due to heavy demands here, foreign mills are able to advance prices to levels higher than they can get in most other foreign markets. They are diverting more steel here.

In contrast with the situation recently, only a few products are on a nominal basis, pricewise, because of lack of availability. These include I-beams and wide flange sections. Prices on oil country pipe may also become nominal soon, as deliveries are so extended (five and six months in some cases).

On most products, deliveries range three to four months.

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.50	$6.50	$6.50	$6.90
Bar Size Angles	6.30	6.30	6.30	6.70
Structural Angles	6.30	6.30	6.30	6.70
I-Beams	6.30*	6.30*	6.30*	6.70*
Wide Flange Beams	6.30*	6.30*	6.30	6.70*
Plates	6.95	6.95	6.95	7.35
Sheets, H.R.	7.45	7.45	7.45	7.85
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	28.43	28.43	28.43	30.28
Barbed Wire (†)	5.95	5.95	5.95	6.28
Merchant Bars	6.50	6.50	6.50	6.90
Hot-Rolled Bands	6.50	6.50	6.50	6.90
Wire Rods, Thomas Commercial No. 5	5.95	5.95	5.95	6.35
Wire Rods, O-H Cold Heading Quality No. 5	6.35	6.35	6.35	6.75
Bright Common Wire Nails (‡)	7.65	7.65	7.65	8.05

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

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OTTAWA STEEL PRODUCTS OSP INC.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 19	$45.00
Oct. 12	45.33
Sept. Avg.	44.42
Oct. 1954	32.25
Oct. 1950	41.37

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting..	44.00-45.00
No. 2 heavy melting..	40.00-41.00
No. 1 bundles	44.00-45.00
No. 2 bundles	37.00-38.00
No. 1 busheling	44.00-45.00
Machine shop turnings.	30.00-31.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings..	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Charging box cast	39.00-40.00
Heavy breakable cast..	39.00-40.00
Unstripped motor blocks	29.00-30.00
No. 1 machinery cast..	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
Rails, 2 ft and under	*55.00-56.00*
Rails, 18 in. and under	*56.00-57.00*
Rails, random lengths	*52.00-53.00*
Railroad specialties	*54.00-55.00*

Stainless Steel Scrap

18-8 bundles & solids	270.00-285.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.50-28.50
Short shovel turnings..	27.50-28.50
Cast iron borings	27.50-28.50
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	49.00-50.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast..	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under..	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths..	58.00-59.00
Cast steel	48.00-49.00
Railroad specialties	54.00-55.00
Uncut tires	49.00-50.00
Angles, splice bars	54.50-55.50
Rails, rerolling	63.00-64.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	290.00-300.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting...	47.50-48.50
No. 2 heavy melting...	35.00-36.00
No. 1 bundles	47.50-48.50
No. 2 bundles	32.00-33.00
No. 1 busheling	47.50-48.50
Machine shop turnings.	24.00-25.00
Short shovel turnings..	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	47.50-48.50
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CHICAGO

No. 1 heavy melting	*43.00-45.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles..	43.00-44.00
No. 2 bundles	33.00-34.00
No. 1 busheling	44.00-46.00
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Cut structurals, 3 ft ..	49.00-50.00
Punchings & plate scrap	50.00-51.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	37.00-38.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
R.R. malleable	56.00-57.00
Rails, 2 ft and under.	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	57.00-58.00
Rails, rerolling	65.00-66.00

Stainless Steel Scrap

18-8 bundles & solids	290.00-300.00
18-8 turnings	160.00-170.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting..	40.00
No. 2 heavy melting..	30.00
No. 1 bundles	40.00
No. 2 bundles	29.00
No. 1 busheling	40.00
Machine shop turnings	22.50
Mixed borings, turnings	22.50
Short shovel turnings	*25.00*
Punchings & plate scrap	46.50

Cast Iron Grades

No. 1 cupola	*40.00*
Charging box cast	*33.00*
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	44.00
Malleable	55.00

BIRMINGHAM

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	28.00-29.00
No. 1 busheling	*38.00-39.00*
Cast iron borings	17.00-18.00
Short shovel turnings..	26.00-27.00
Machine shop turnings	25.00-26.00
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*45.00-46.00*
Structural, 2 ft	*44.00-45.00*
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
Rails, 18-in. and under	56.00-59.00
Rails, rerolling	57.00-58.00
Rails, random lengths..	52.00-53.00
Angles, splice bars	53.00-54.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting...	46.00-47.00
No. 2 heavy melting...	40.00-41.00
No. 1 bundles	46.00-47.00
No. 2 bundles	*37.00-38.00*
No. 1 busheling	46.00-47.00
Electric furnace bundles	48.50
Machine shop turnings.	28.50-29.50
Mixed borings, turnings	28.50-29.50
Short shovel turnings..	30.50-31.50
Structurals & plate	49.00-50.00
Heavy turnings	45.00
Couplers, springs, wheels	*51.00-52.00*
Rail crops, 2 ft & under	58.00-59.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Malleable	*59.00*
Heavy breakable cast..	45.00-46.00
Drop broken machinery	47.00-48.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting..	41.00-42.00
No. 2 heavy melting..	37.00-38.00
No. 1 bundles	*41.00-42.00*
No. 2 bundles	32.00-33.00
Machine shop turnings.	20.00-21.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings.	22.00-23.00
Low phos. (structural & plate)	42.00-43.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	38.00-39.00

Stainless Steel

18-8 sheets, clips, solids	*290.00-300.00*
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	*120.00-125.00*
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting..	36.50-37.50
No. 2 heavy melting..	31.00-31.50
No. 1 bundles	36.50-37.50
No. 2 bundles	27.00-27.50
Machine shop turnings	*20.00-20.50*
Mixed borings, turnings	22.50-23.00
Short shovel turnings..	23.50-24.00
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast..	35.00-36.00

BUFFALO

No. 1 heavy melting...	38.00-39.00
No. 2 heavy melting..	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	32.00-33.00
No. 1 busheling	38.00-39.00
Mixed borings, turnings	28.00-29.00
Machine shop turnings.	26.00-27.00
Short shovel turnings..	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths.	47.00-48.00
Rails, 2 ft and under.	51.00-52.00
Railroad specialties.	48.00-49.00

CINCINNATI

(Brokers' buying prices: f.o.b. shipping point)

No. 1 heavy melting...	41.50-42.50
No. 2 heavy melting...	36.00-37.00
No. 1 bundles	41.50-42.50
No. 2 bundles	33.00-34.00
No. 1 busheling	41.50-42.50
Machine shop turnings.	27.00-28.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings..	30.00-31.00
Cast iron borings	24.00-25.00
Low phos., 18 in.	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast..	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths.	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting ..	38.50
No. 2 heavy melting ..	36.00
No. 1 bundles	39.50
No. 2 bundles	31.50
Machine shop turnings	*28.00*
Short shovel turnings	*28.00*

Cast Iron Grades

No. 1 cupola	46.50
Charging box cast	39.00
Heavy breakable cast..	37.00
Unstripped motor blocks	37.00
Brake shoes	36.00
Clean auto cast	47.00
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt	*48.00*
Rails, 18 in. and under	59.00
Rails, random lengths..	55.00
Rails, rerolling	64.00
Angles, splice bars	55.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting..	39.50
No. 2 heavy melting..	35.50
No. 1 bundles	35.50
No. 2 bundles	30.50
No. 3 bundles	19.00
Machine shop turnings.	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings..	15.00-16.00
Electric furnace, No. 1.	50.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast..	38.00
No. 1 wheels	35.00
Unstripped motor blocks	29.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	35.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths..	33.00

LOS ANGELES

No. 1 heavy melting..	33.00
No. 2 heavy melting..	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
Machine shop turnings.	10.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting ..	37.00
No. 2 heavy melting ..	35.00
No. 1 bundles	37.00
No. 2 bundles	32.00
No. 1 busheling	37.00
Machine shop turnings.	14.00
Mixed borings, turnings	14.00
Short shovel turnings..	17.00
Cast iron borings	17.00
Cut structurals	39.00
Heavy turnings	17.00
Punchings & plate scrap	37.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast.	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting..	38.50
No. 2 heavy melting..	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	38.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast..	42.00-45.00

†F.o.b., shipping point.

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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SAN FRANCISCO, CAL.

EXPORTS-IMPORTS — LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

(*Concluded from page 159*)

has attracted heavy receipts from remote points. One large plant that previously sold its scrap to one of the largest mills in the area is calling for bids on its list.

Low mill inventories, heavy domestic consumption and active export influences are the underlying factors in the current situation.

Cleveland—With buyers out of the market for the moment, scrap is steady but unchanged at levels established about a week or ten days ago. No immediate change in the market situation is indicated, with consumers' stocks considered fair for this season.

Pig Iron . . .

Pig Iron Prices, Page 147

Business in merchant pig iron continues at the best level this year.

Foundries are enjoying good business, and their prospects for the fourth quarter are bright. They generally are operating five days a week, or more, with full working forces. Some automotive foundries have fallen back a little due to model change-overs. This activity, combined with a tight market for cast scrap, is contributing greatly to the demand for pig iron.

The foundries are taking in iron steadily, but with no supply shortage in prospect, they are not ordering far ahead. For the most part sellers are booking on a month-to-month basis. Little in the way of first quarter inquiry has appeared. This, however, is not unusual since contracting in pig iron has been more or less on a month-to-month basis since the war.

Prices are unchanged at the levels established in July following the general increase in steel wages.

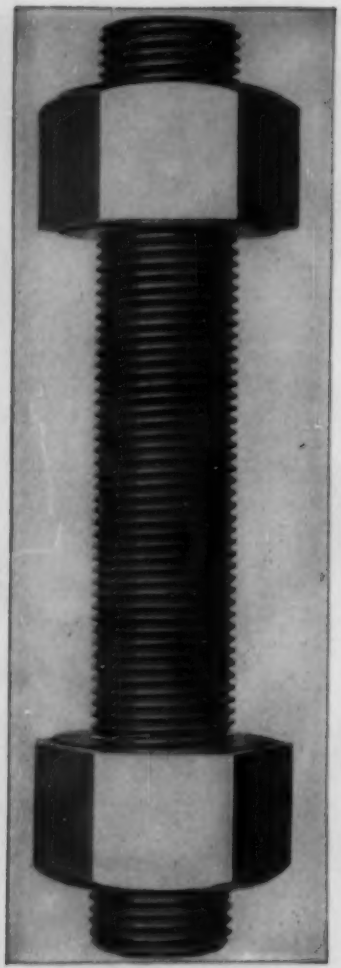
Iron Ore . . .

Iron Ore Prices, Page 156

Shipments of iron ore on the Great Lakes in September amounted to 12,756,566 gross tons, reports the Lake Carriers Association. This was the third largest monthly movement in history.

Republic Steel Corp. is disposing of its St. Paul-Day iron ore mine at Keewatin, Minn., and its Stevenson mine, Stuntz Township, Minn., together with plant and equipment used in connection with the operations. New owner: Pacific Isle Mining Co., Hibbing, Minn.

The movement of iron ore from the head of the lakes in the week ended Oct. 17 totaled 2,731,678 gross tons, reports the Lake Superior Iron Ore Association. This compares



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DRILLS 7% MORE GRAY IRON VALVE BODIES PER SHIFT

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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 51, Niagara Falls, N. Y. 60-01

CARBORUNDUM®

with shipments of 1,564,310 tons in the like week a year ago.

Cumulative shipments in the lake navigation season to Oct. 17 were 74,171,483 tons.

Consumption of Lake Superior ore in September totaled 7,538,666 gross tons. This compares with 7,484,775 in the preceding month and with 4,619,843 in the corresponding month a year ago. Consumption through September this year totaled 65,404,752 tons against 49,442,501 in the like period of 1954.

Stocks on lower lake docks and at furnaces on Oct. 1 totaled 45,406,437 gross tons. This was an increase compared with 39,505,818 on Sept. 1 but is down from the 49,752,763 tons held on Oct. 1, 1954.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 156

Strong demand for oven foundry coke, notably from shops turning out automotive castings, is expected to continue into the first quarter next year. Furnace coke supplies are tight, reflecting high steelmaking operations.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

12,000 tons, Joseph E. Seagram & Sons Inc., 375 Park Ave., New York, to Bethlehem Steel Co., Bethlehem, Pa.

640 tons, factory building, Progress Mfg. Co., Philadelphia, to Luria Engineering Co.

615 tons, junior high school, Waltham, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Vara Construction Co., Boston, general contractor; 65 tons, reinforcing, Northern Steel Inc., Medford, Mass.

565 tons, high school, Deran, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, RCA factory building, Bridgewater, N. J., to Frank M. Weaver & Co.

375 tons, 574-ft Montana state, Yellowstone river bridge, to unstated interest; general contract to W. O. Roscoe, Billings, Mont., low at $294,479.

360 tons, war memorial building, Cambridge Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Rich Bros. Construction Co., Boston, general contractor.

275 tons, service building, Hercules Powder Co., Wilmington, Del., to Easton Structural Steel Co., Easton, Pa.

150 tons, elementary school, Gloucester, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Vappi Construction Co., Cambridge, general contractor.

STRUCTURAL STEEL PENDING

10,000 tons, automatic transmission plant, Ford Motor Co., Sharonville, O.; bids asked.

3750 tons, bridge superstructure, Mississippi River Bridge Authority, New Orleans; Bethlehem Steel Co., Bethlehem, Pa., is low bidder.

3425 tons, bridge superstructure, ten riveted plate girder spans, Connecticut turnpike, Saugatuck river, Westport, Conn.; bids Nov. 7, Hartford, Conn.

2900 tons, eight grade separation structures and bridge over New Haven Railroad, Connecticut turnpike, Darien-Norwalk, Conn.; bids Oct. 24, Hartford, Conn.

1610 tons, two grade separation structures; also five-span bridge over New Haven Railroad, Connecticut turnpike, Greenwich, Conn.; bids Oct. 24, Hartford, Conn.

1700 tons, state thruway work, Chatauqua county, New York; bids Oct. 27.

1225 tons, substructure, bridge, Saugatuck river, and three grade separations, Connecticut turnpike, Westport, Conn.; bids Oct. 24, Hartford, Conn.

1205 tons, eight grade separation structures.

90-Pound Tie Plates

350 Tons Strictly No. 1 Relay Tie Plates

Also new and relay rail, new track spikes, bolts and track turnouts for prompt shipment.

Write or wire for prices.

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Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

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Replies may be brief and should include age, present connection and home telephone number.

Reply Box 323, STEEL

Penton Bldg. Cleveland 13, Ohio

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Solar Aircraft, a rapidly expanding company and a national leader in metal fabrication, needs the following types of technical personnel:

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CLASSIFIED

Positions Wanted

BLAST FURNACE SUPERINTENDENT. Basic, merchant iron. Single, multi-furnace plants. Cost conscious, organizational ability. Excellent operating, labor relations, and engineering background. Tech. graduate, 43 years old. Reply Box 320, STEEL, Penton Building, Cleveland 13, Ohio.

ELECTRIC MELTING SUPERVISOR, over twenty years' experience large operation. Available November 15. References. Reply Box 322, STEEL, Penton Bldg., Cleveland 13, Ohio.

ENGINEER—Thirty years technical and sales experience—Blast Furnace, Combustion and Allied Equipment. Wishes to represent manufacturer or contractor in Pittsburgh district. Reply Box 325, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Have had over 30 years experience, supervising the fabrication of bridge girders, plate girders, trusses, columns, floor beams, girts, etc., required for industrial and apartment construction, either welded, riveted or bolted. Can assume full responsibility from point of mill order, details, template (wood or paper) fitting punching, layout and assembly departments. All supervision from floor of plant with the men. Have excellent experience with trade and labor. Supervised plant with average tonnage of 12,500 tons per year. Willing to move anywhere. Reply Box 326, STEEL, Penton Bldg., Cleveland 13, Ohio.

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All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

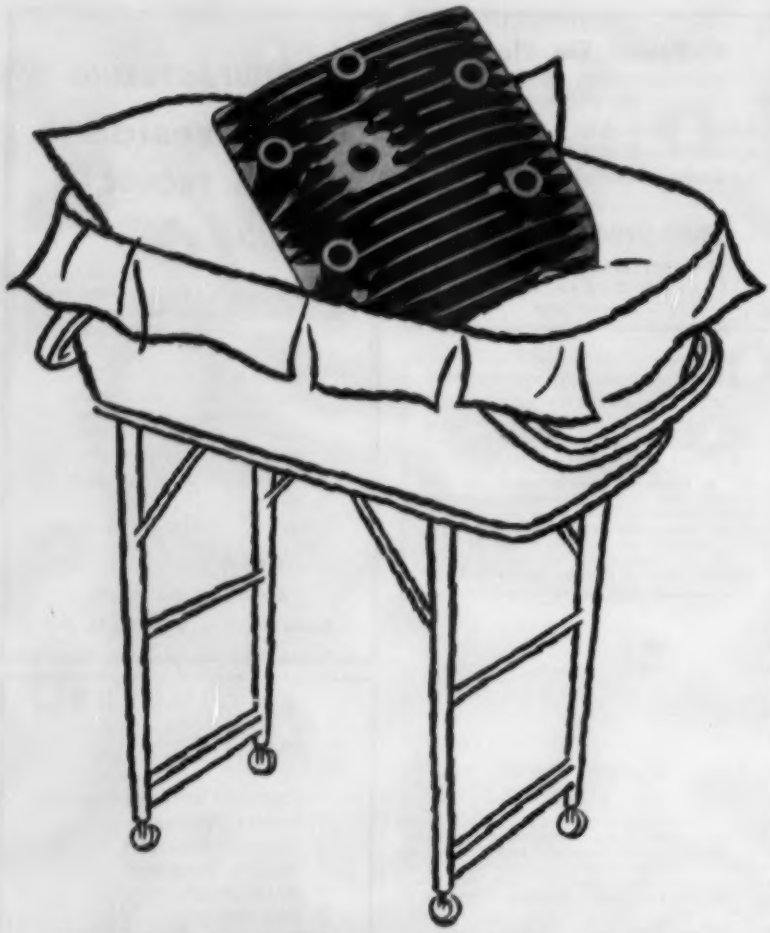
CLASSIFIED

Help Wanted

ELECTRICAL ENGINEER EXPERIENCED IN INDUCTION HEATING. Must be capable of designing induction heating and control components. Established concern. Salary open. Reply Box 312, STEEL, Penton Bldg., Cleveland 13, Ohio.

Accounts Wanted

PHILADELPHIA FASTENER REPRESENTATIVE seeks companion lines—Nails, AN Hardware, Stainless Fasteners, Wire Formed Products, Stampings, Production Tools, etc. Reply Box 321, STEEL, Penton Building, Cleveland 13, Ohio.



This casting took a lot of pre-natal care

The success of a casting is often determined long before the metal is melted and the casting poured, because no matter how carefully casting is done nor how excellent the mold, a quality part cannot result unless quality metal is used.

Foundries and die-casters need ingots that will be alike in quality and characteristics from lot to lot, especially when castings of intricate character must be precisely cast in quantities. To assure such results, the Federated Metals Division of American Smelting and Refining Company employs the most modern quality control methods. Electronic testing devices and expert metallurgists check each heat poured from Federated's furnaces.

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Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

Connecticut turnpike, Westport-Fairfield, Conn.; bids Oct. 24, Hartford, Conn.

1600 tons, store addition, Jo Dan & Marsh Co., Boston.

800 tons, state turnpike, section 37-K, Lackawanna county, Pa.; George M. Brewster, Bogota, N. J., is low on general contract.

385 tons, state bridge work, Lycoming county, Pa.; bids Oct. 28.

200 tons, Pennsylvania Railroad bridge, Naaman, Del.; A. S. Rickatron Inc., Skaneteles, N. Y., is low on general contract.

100 tons, Idaho state, Pend Oreille bridge, Bonner county; Peter Kiewit Sons Co. and LeBoeuf-Daugherty, Sand Point, Idaho, joint low at $323,783.

100 tons, untanking tower, Glen H. Bell substation; Max J. Kuney Co., Spokane, Wash., low at $63,299 to the Bonneville Power Administration, Portland, Oreg.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, extension of waterfront viaduct, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Rumsey & Co., Seattle, general contractor.

750 tons, laboratory, Massachusetts Institute of Technology, Cambridge, Mass., to Northern Steel Inc., Medford, Mass.; George A. Fuller Co., Boston, general contractor; structurals to Babcock-Davis Associates Inc., Cambridge.

560 tons, Washington state overcrossing, Auburn, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Anderson Bridge Construction Co., Tacoma, Wash., general contractor, low at $397,630.

310 tons, five state bridges, Plymouth, Mass., to Truscon Steel Division, Republic Steel Corp., Boston; General Construction Co., Lawrence, Mass., general contractor.

235 tons, plant extension, Kaiser Aluminum & Chemical Co., Tacoma, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

180 tons, Washington state Satus bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; C. E. O'Neal, general contractor.

150 tons, municipal filtration plant, Philadelphia, to the Concrete Steel Co., Philadelphia.

125 tons, including joists, Hunt Memorial Hospital, Danvers, Mass., to Concrete Steel Co., Boston; Joseph Rugo Inc., Boston, general contractor.

100 tons, or more, city garage and warehouse, New Haven, Conn., to Ceco Steel Products Corp., New York; J. H. Hogan Co., New Haven, general contractor; structurals, Alderhurst Iron Works, New Haven.

100 tons, Rimrock bridge project, Bureau of Public Roads, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

100 tons, state highway bridge, Whitefield, N. H.; bids in.

PLATES . . .

PLATES PLACED

1100 tons, H-piling, rebuilding Morrison street bridge, Portland, Oreg., to Columbia-Geneva Steel Division, U. S. Steel Corp., and Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, is general contractor.

PLATES PENDING

210 tons, hull, high tensile, General Stores Supply Office, Navy, Philadelphia, Oct. 24.

150 tons, 1-million-gal steel standpipe; bids to Ruth Wall, clerk, Quincy, Wash., Oct. 24.

PIPE . . .

CAST IRON PIPE PENDING

131 tons, various sizes, bids opened at Tacoma, Wash., Oct. 17

100 tons, 8400 ft of 4 and 6 in.; bids to Silver Lake District, Everett, Wash., Oct. 24.

RAILS, CARS . . .

RAILROAD CARS PLACED

Northern Pacific, 100 seventy-ton refrigerator cars, to Pacific Car & Foundry Co., Renton, Wash.

Alaska railroad, 50 seventy-ton flatcars, to Warren Car Co., Warren, Pa.

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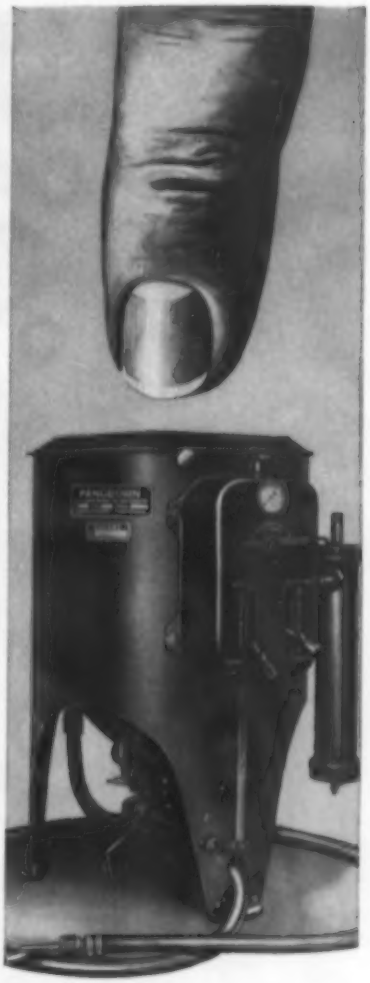

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